

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

PLAN AND PROFILE OF THE INTERSECTION OF ROUTE 110 & TADMUCK ROAD

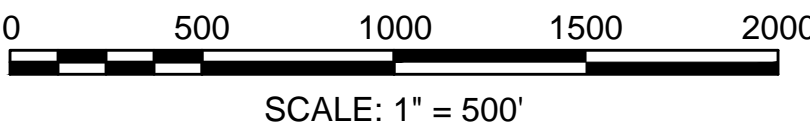
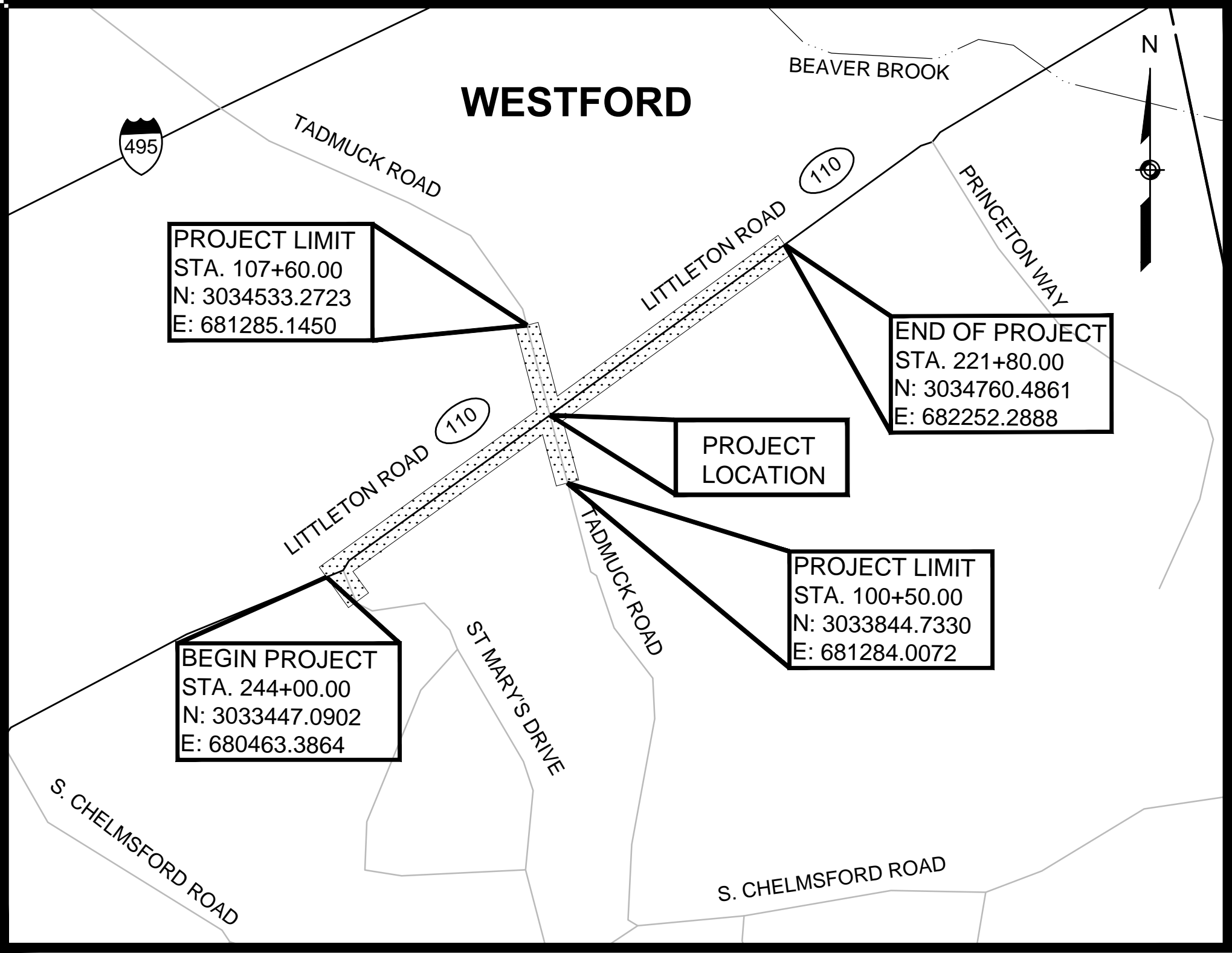
IN THE TOWN OF
WESTFORD
MIDDLESEX COUNTY

FEDERAL AID PROJECT NO.

25% RE-SUBMITTAL

INDEX

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LENGTH OF PROJECT = 2220.00 FEET = 0.420 MILES

JUNE 11, 2015

WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	1	40
PROJECT FILE NO. 607251			
TITLE SHEET & INDEX			

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JUNE 15, 2012, THE INTERIM SUPPLEMENTAL SPECIFICATIONS DATED DECEMBER 12, 2014, THE 2014 CONSTRUCTION STANDARD DETAILS, THE 1996 CONSTRUCTION AND TRAFFIC STANDARD DETAILS (AS RELATES TO TRAFFIC STANDARD DETAILS ONLY), THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

DESIGN DESIGNATION (LITTLETON ROAD/ROUTE 110)

DESIGN SPEED	45 MPH
ADT (2013)	10,200
ADT (2033)	14,500
K	0.12
D	53% EB
T (PEAK HOUR)	2.6%
T (AVERAGE DAY)	4.7%
DHV	1,400
DDHV	940
FUNCTIONAL CLASSIFICATION	URBAN MINOR ARTERIAL

DESIGN DESIGNATION (TADMUCK ROAD)

DESIGN SPEED	35 MPH
ADT (2013)	5,500
ADT (2033)	6,200
K	0.10
D	75% NB
T (PEAK HOUR)	0.7%
T (AVERAGE DAY)	1.7%
DHV	640
DDHV	480
FUNCTIONAL CLASSIFICATION	URBAN COLLECTOR

2015-06-11	25% RE-SUBMISSION	1
2014-04-18	25% SUBMISSION	0
DATE	DESCRIPTION	REV #

	RECOMMENDED FOR APPROVAL	
	CHIEF ENGINEER	DATE
	APPROVED	
DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION APPROVED:		
DIVISION ADMINISTRATOR	DATE	HIGHWAY ADMINISTRATOR
		DATE

GENERAL SYMBOLS			TRAFFIC SYMBOLS			ABBREVIATIONS		
EXISTING	PROPOSED	DESCRIPTION	EXISTING	PROPOSED	DESCRIPTION	GENERAL	WESTFORD RT 110 & TADMUCK ROAD	
		JERSEY BARRIER			CONTROLLER PHASE ACTUATED	AADT	ANNUAL AVERAGE DAILY TRAFFIC	
		CATCH BASIN			TRAFFIC SIGNAL HEAD (SIZE AS NOTED)	ABAN	ABANDON	
		CATCH BASIN CURB INLET			WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)	ADJ	ADJUST	
		FLAG POLE			VIDEO DETECTION CAMERA	APPROX.	APPROXIMATE	
		GAS PUMP			MICROWAVE DETECTOR	A.C.	ASPHALT CONCRETE	
		MAIL BOX			PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE	ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE	
		POST SQUARE			EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT	BIT.	BITUMINOUS	
		POST CIRCULAR			VEHICULAR SIGNAL HEAD	BC	BOTTOM OF CURB	
		WELL			VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED	BD.	BOUND	
		ELECTRIC HANDHOLE			FLASHING BEACON	BL	BASELINE	
		FENCE GATE POST			PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)	BLDG	BUILDING	
		GAS GATE			RAILROAD SIGNAL	BM	BENCHMARK	
		BORING HOLE			SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)	BO	BY OTHERS	
		MONITORING WELL			MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)	BOS	BOTTOM OF SLOPE	
		TEST PIT			HIGH MAST POLE OR TOWER	BR.	BRIDGE	
		HYDRANT			SIGN AND POST	CB	CATCH BASIN	
		LIGHT POLE			SIGN AND POST (2 POSTS)	CBCI	CATCH BASIN WITH CURB INLET	
		COUNTY BOUND			MAST ARM WITH LUMINAIRE	CC	CEMENT CONCRETE	
		GPS POINT			OPTICAL PRE-EMPTION DETECTOR	CCM	CEMENT CONCRETE MASONRY	
		CABLE MANHOLE			CONTROL CABINET, GROUND MOUNTED	CEM	CEMENT	
		DRAINAGE MANHOLE			CONTROL CABINET, POLE MOUNTED	CI	CURB INLET	
		ELECTRIC MANHOLE			LOAD CENTER ASSEMBLY	CIP	CAST IRON PIPE	
		GAS MANHOLE			PULL BOX 12"x12" (OR AS NOTED)	CLF	CHAIN LINK FENCE	
		MISC MANHOLE			ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)	CL	CENTERLINE	
		SEWER MANHOLE			TRAFFIC SIGNAL CONDUIT	CMP	CORRUGATED METAL PIPE	
		TELEPHONE MANHOLE				CSP	CORRUGATED STEEL PIPE	
		WATER MANHOLE				CO.	COUNTY	
		MASSACHUSETTS HIGHWAY BOUND				CONC	CONCRETE	
		MONUMENT				CONT	CONTINUOUS	
		STONE BOUND				CONST	CONSTRUCTION	
		TOWN OR CITY BOUND				CR GR	CROWN GRADE	
		TRAVERSE OR TRIANGULATION STATION				DHV	DESIGN HOURLY VOLUME	
		TROLLEY POLE OR GUY POLE				DI	DROP INLET	
		TRANSMISSION POLE				DIA	DIAMETER	
		UTILITY POLE W/ FIREBOX				DIP	DUCTILE IRON PIPE	
		UTILITY POLE WITH DOUBLE LIGHT				DW	STEADY DON'T WALK - PORTLAND ORANGE	
		UTILITY POLE W / 1 LIGHT				DWY	DRIVEWAY	
		UTILITY POLE				ELEV (or EL.)	ELEVATION	
		BUSH				EMB	EMBANKMENT	
		TREE				EOP	EDGE OF PAVEMENT	
		STUMP				EXIST (or EX)	EXISTING	
		SWAMP / MARSH				EXC	EXCAVATION	
		WATER GATE				F&C	FRAME AND COVER	
		PARKING METER				F&G	FRAME AND GRATE	
		OVERHEAD CABLE/WIRE				FDN.	FOUNDATION	
		CURBING				FLDSTN	FIELDSTONE	
		CONTOURS (ON-THE-GROUND SURVEY DATA)				GAR	GARAGE	
		CONTOURS (PHOTOGRAMMETRIC DATA)				GD	GROUND	
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)				GG	GAS GATE	
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)				GI	GUTTER INLET	
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)				GIP	GALVANIZED IRON PIPE	
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)				GRAN	GRANITE	
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)				GRAV	GRAVEL	
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)				GRD	GUARD	
		BALANCED STONE WALL				HDW	HEADWALL	
		GUARD RAIL - STEEL POSTS				HMA	HOT MIX ASPHALT	
		GUARD RAIL - WOOD POSTS				HOR	HORIZONTAL	
		CHAIN LINK OR METAL FENCE				HYD	HYDRANT	
		WOOD FENCE				INV	INVERT	
		COMPOST MULCH FILTER TUBES				JCT	JUNCTION	
		TREE LINE				L	LENGTH OF CURVE	
		SAWCUT LINE				LB	LEACH BASIN	
		TOP OR BOTTOM OF SLOPE				LP	LIGHT POLE	
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY				LT	LEFT	
		BANK OF RIVER OR STREAM				MAX	MAXIMUM	
		BORDER OF WETLAND				MB	MAILBOX	
		100 FT WETLAND BUFFER				MH	MANHOLE	
		200 FT RIVERFRONT BUFFER				MHB	MASSACHUSETTS HIGHWAY BOUND	
		STATE HIGHWAY LAYOUT				MIN	MINIMUM	
		TOWN OR CITY LAYOUT				NIC	NOT IN CONTRACT	
		COUNTY LAYOUT				NO.	NUMBER	
		RAILROAD SIDELINE				PC	POINT OF CURVATURE	
		TOWN OR CITY BOUNDARY LINE				PCC	POINT OF COMPOUND CURVATURE	
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE				P.G.L.	PROFILE GRADE LINE	
		EASEMENT				PI	POINT OF INTERSECTION	
		FULL DEPTH PAVEMENT				POC	POINT ON CURVE	
						POT	POINT ON TANGENT	
						PRC	POINT OF REVERSE CURVATURE	
						PROJ	PROJECT	
						PROP	PROPOSED	
						PSB	PLANTABLE SOIL BORROW	
						PT	POINT OF TANGENCY	
						PVC	POINT OF VERTICAL CURVATURE	
						PVI	POINT OF VERTICAL INTERSECTION	
						PVT	POINT OF VERTICAL TANGENCY	
						PVMT	PAVEMENT	
						PWW	PAVED WATER WAY	

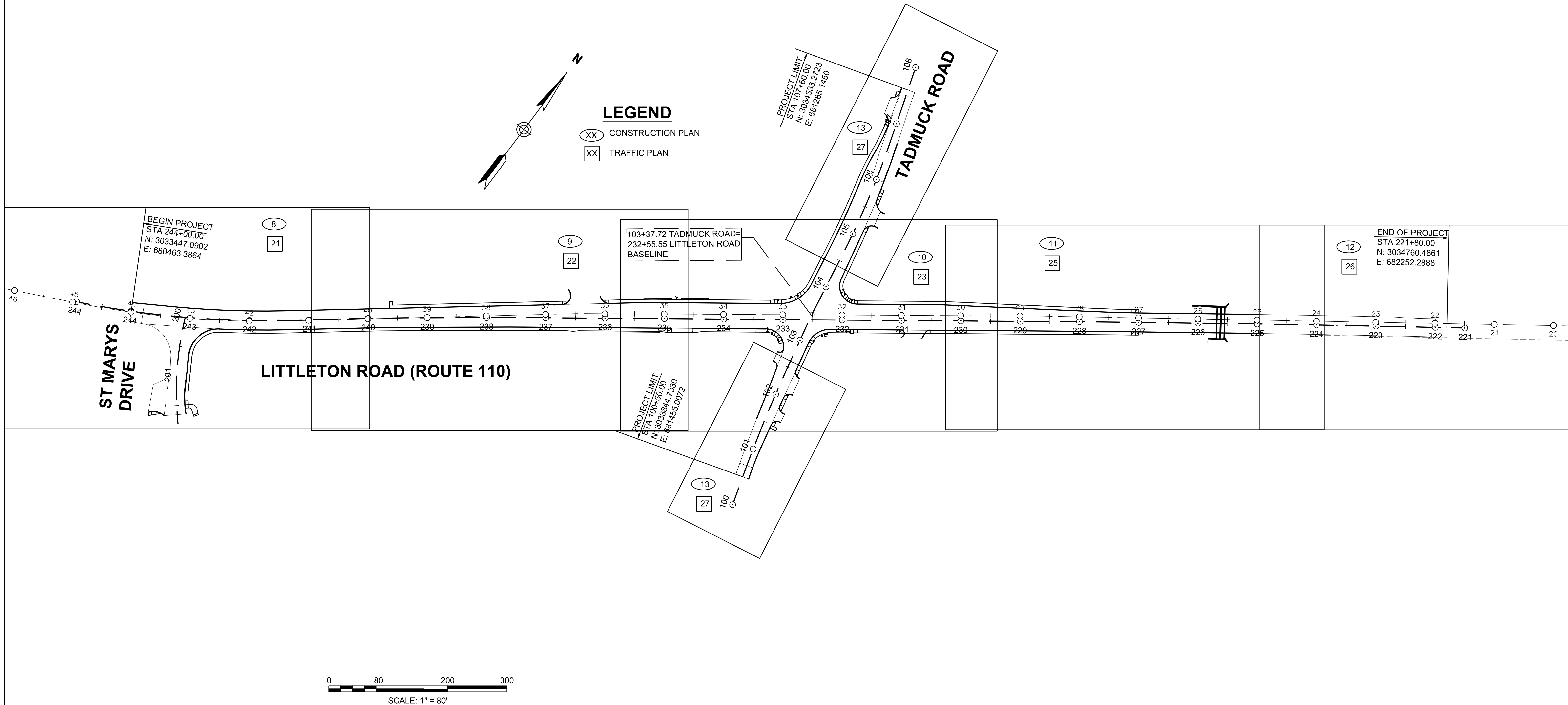
GENERAL	DESCRIPTION
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

GENERAL	DESCRIPTION
CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR AMBER
FYL	FLASHING AMBER LEFT ARROW
FYR	FLASHING AMBER RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW

GENERAL NOTES

- TOPOGRAPHICAL INFORMATION FROM A SURVEY PROVIDED BY LANDTECH CONSULTANTS OF WESTFORD, MA ON APRIL 8, 2013; AND SUPPLEMENTED WITH SURVEY PERFORMED BY CORNERSTONE LAND CONSULTANTS, LCC IN 2008/2009; AND WITH SURVEY PERFORMED BY VANASSE HANGEN BRUSTLIN, INC IN 2015. THE HORIZONTAL COORDINATE SYSTEM IS ON THE MASS GRID SYSTEM NAD83 AND THE VERTICAL COORDINATE SYSTEM IS NAVD 1988.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, CATV AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
- THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- SAWCUT SURFACES ABUTTING THE PAVEMENT TOP COURSE SHALL BE COATED WITH HMA JOINT SEALANT.
- EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND RESET UNLESS INDICATED OTHERWISE ON THE PLANS.
- LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 0.01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- CAUTION SHOULD BE EXERCISED WHEN COMPACTING WITH A HEAVY VIBRATORY ROLLER IN AREAS WHERE SHALLOW DEPTHS OF COVER (LESS THAN 2 FEET) EXIST ABOVE THE TOP OF PROPOSED PIPE. THESE AREAS SHOULD BE CLEARLY MARKED WITH STAKING. STAKING SHALL BE PLACED A MINIMUM OF SIX FEET AROUND THE AREA WHERE THE CONDITION EXISTS. THESE AREAS SHALL BE COMPACTED UTILIZING A LIGHTWEIGHT VIBRATORY PLATE COMPACTOR UNTIL THE REQUIRED COMPACTION IS REACHED.
- EXISTING UTILITY POLES SHALL BE RELOCATED BY OTHERS.
- TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
- AFTER PAVEMENT MILLING OPERATIONS AND PRIOR TO PAVING OF THE INTERMEDIATE (BINDER) COURSE THE ENGINEER SHALL EVALUATE THE MILLED SURFACE AND SHALL APPLY THE APPROPRIATE REPAIR METHOD; IF REQUIRED.
- SAWCUTS SHALL BE MADE IN THE EXISTING PAVEMENT AT AREAS OF NEW CURB, AREAS OF TRENCHING, FOR CONDUIT OR UTILITY WORK, LIMITS OF PAVEMENT MICRO-MILLING AND FULL DEPTH PAVEMENT, SIDEWALK AND DRIVEWAY CONSTRUCTION, AND AS DIRECTED BY THE ENGINEER. PAYMENT FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL AND INCLUDED IN THE UNIT PRICE UNDER THE APPLICABLE ITEMS.
- SILT SACKS SHALL BE INSTALLED IN ALL EXISTING CATCH BASINS PRIOR TO THE START OF CONSTRUCTION. SILT SACKS SHALL BE INSTALLED ON ALL NEW CATCH BASINS IMMEDIATELY AFTER INSTALLATION.

WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	3	40
PROJECT FILE NO.		607251	
GENERAL NOTES			



WESTFORD
RT 110 & TADMUCK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	5	40
PROJECT FILE NO. 607251			

TYPICAL SECTIONS & PAVEMENT NOTES

PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT (ROUTE 110/LITTLETON ROAD)

SURFACE: 1.75" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)
1.75" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5)

BASE: 4" HOT MIX ASPHALT
SUPERPAVE BASE COURSE - 37.5 (SBC-37.5)

SUBBASE: 4" DENSE GRADED CRUSHED STONE OVER
8" GRAVEL BORROW, TYPE b.

PROPOSED FULL DEPTH PAVEMENT - WIDENING (LESS THAN 4.0' WIDE)

SURFACE: 1.75" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)
1.75" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5)

BASE: 6" HIGH EARLY STRENGTH CEMENT
CONCRETE BASE COURSE

SUBBASE: 12" GRAVEL BORROW, TYPE b.

PROPOSED PAVEMENT MILLING & OVERLAY

SURFACE: 1.75" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5)

PAVEMENT MILLING 1.75" DEPTH

PROPOSED CEMENT CONCRETE WALK/ WHEELCHAIR RAMP

SURFACE: 4" CEMENT CONCRETE
AIR ENTRAINED 4000 PSI, 3/4", 610

FOUNDATION: 8" GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE DRIVEWAY

SURFACE: 6" CEMENT CONCRETE
AIR ENTRAINED 4000 PSI, 3/4", 610

FOUNDATION: 8" GRAVEL BORROW, TYPE b

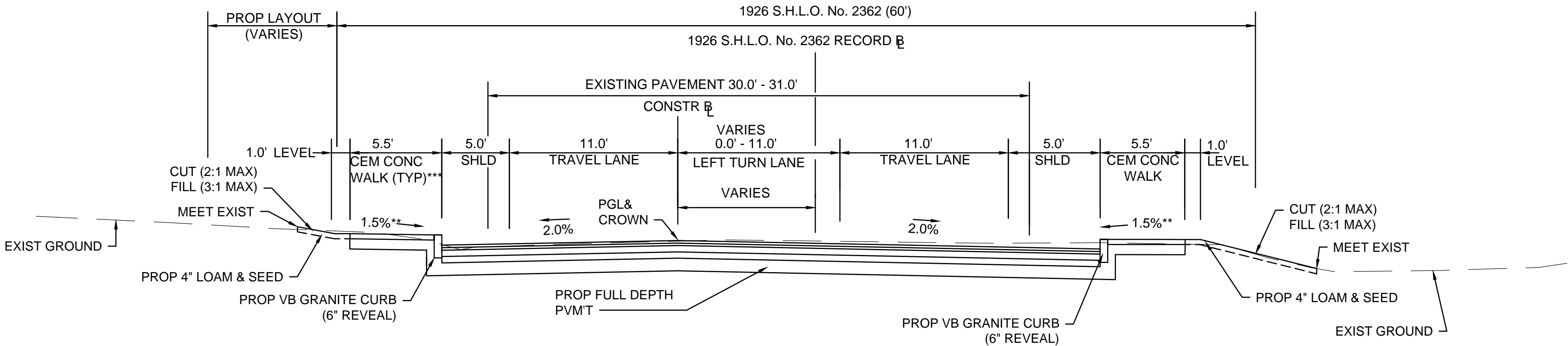
PROPOSED HMA DRIVE

SURFACE: 3 1/2" HOT MIX ASPHALT
(1 1/2" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5))
2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5))

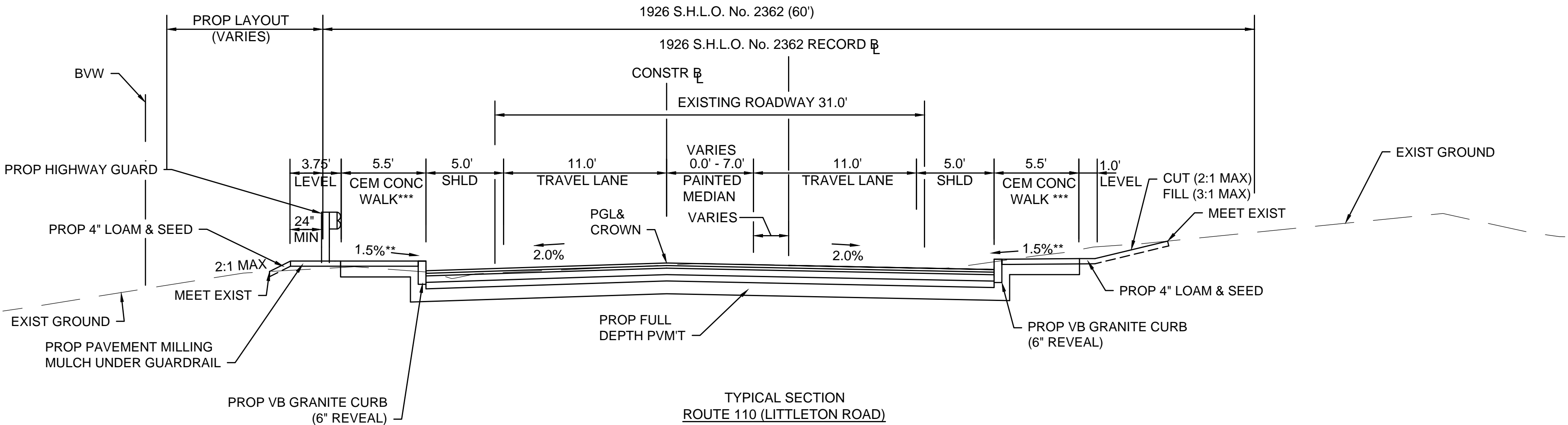
SUBBASE: 8" GRAVEL BORROW TYPE b

NOTE:

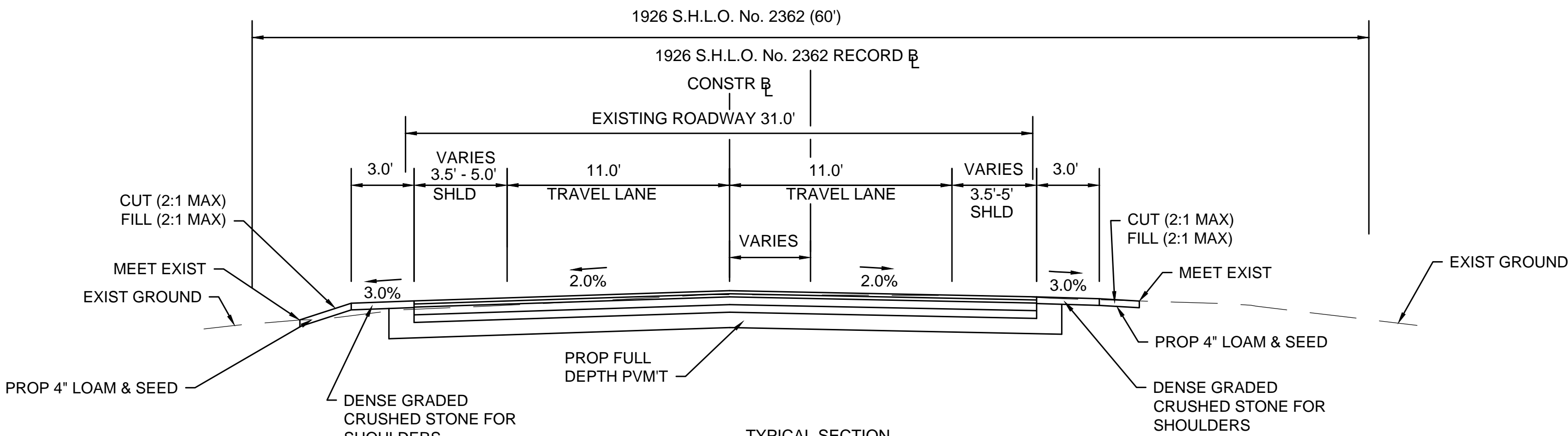
ASPHALT EMULSION FOR TACK COAT (RS-1) AT 0.05 GAL/SY OVER SMOOTH SURFACE
ASPHALT EMULSION FOR TACK COAT (RS-1) AT 0.07 GAL/SY OVER MILLED SURFACE



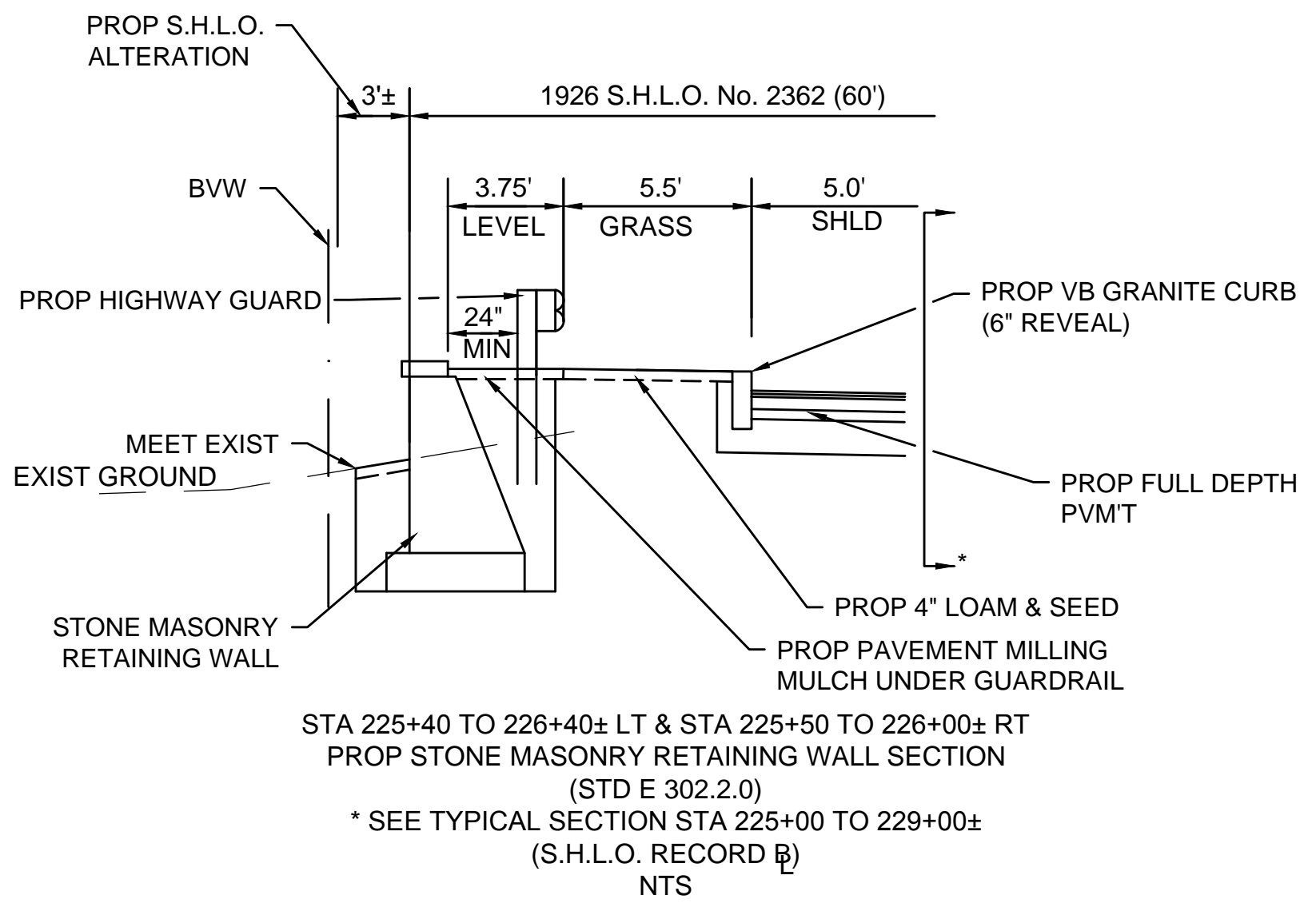
TYPICAL SECTION
ROUTE 110 (LITTLETON ROAD)
STA 229+00 TO 232+50± (S.H.L.O. RECORD B)
NTS
**TOLERANCE FOR CONSTRUCTION ±0.5%
*** SIDEWALK TO BE INSTALLED FROM STA 230+50 TO 232+50±



TYPICAL SECTION
ROUTE 110 (LITTLETON ROAD)
STA 225+00 TO 229+00± (S.H.L.O. RECORD B)
NTS
** TOLERANCE FOR CONSTRUCTION ±0.5%
*** SIDEWALK TO BE INSTALLED FROM STA 227+00 TO 229+00±
**** SEE ADDITIONAL SECTION FOR RETAINING WALL LOCATION
(STA 225+40 TO 226+40± LT & STA 225+50 TO 226+00± RT)



TYPICAL SECTION
ROUTE 110 (LITTLETON ROAD)
STA 222+00 TO 225+00± (S.H.L.O. RECORD B)
NTS

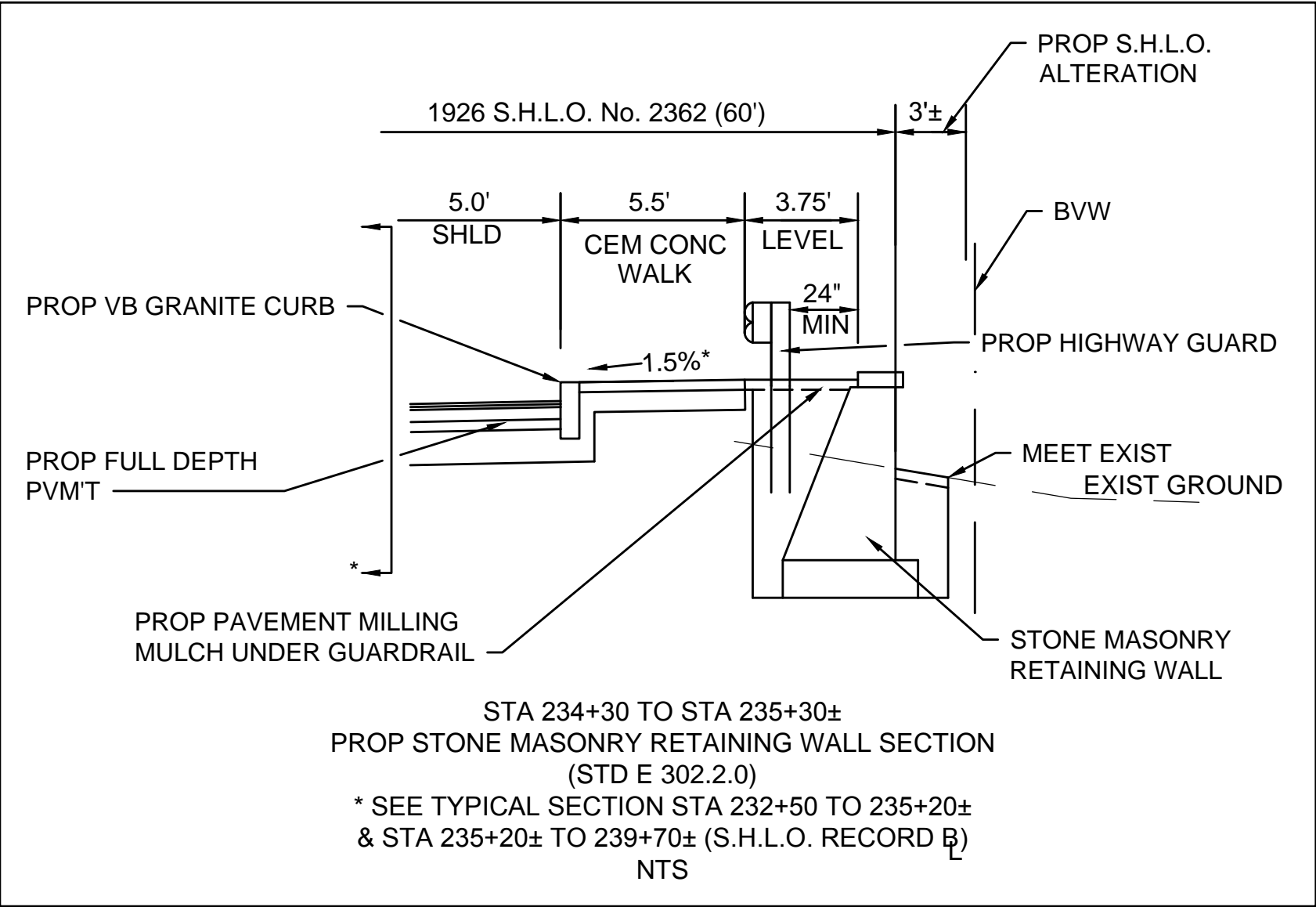
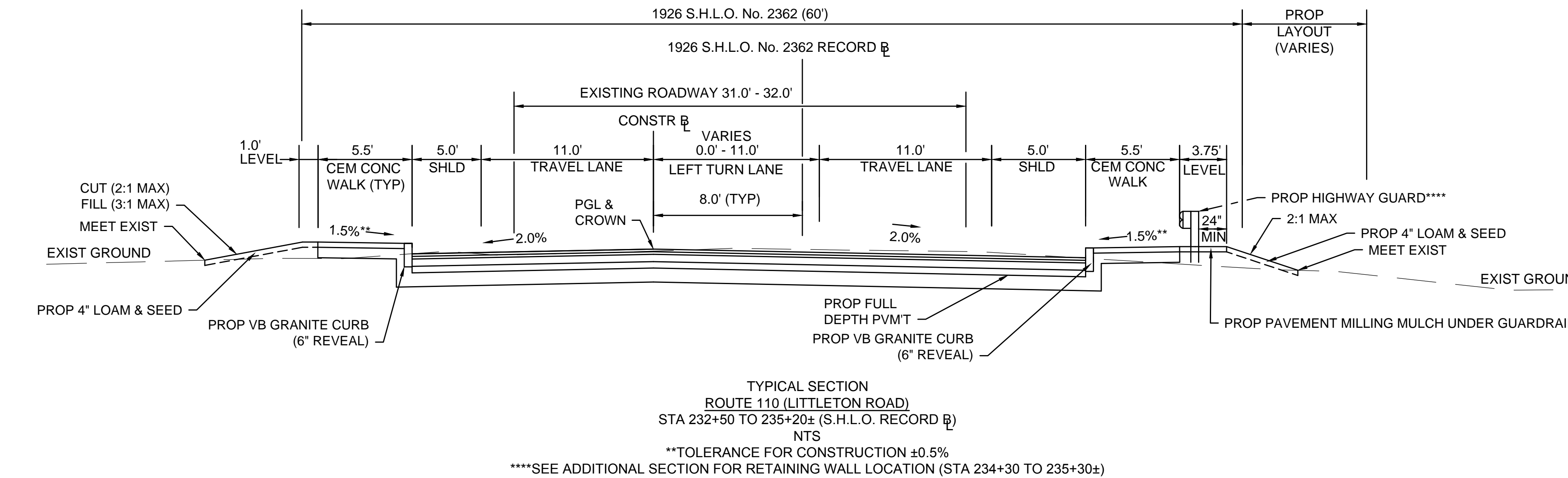
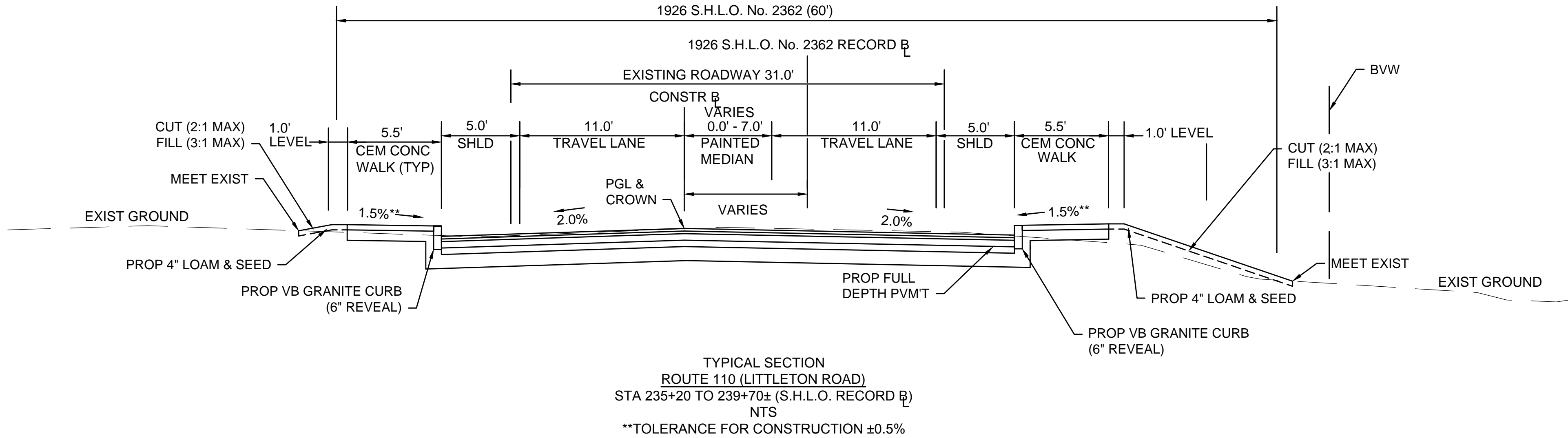
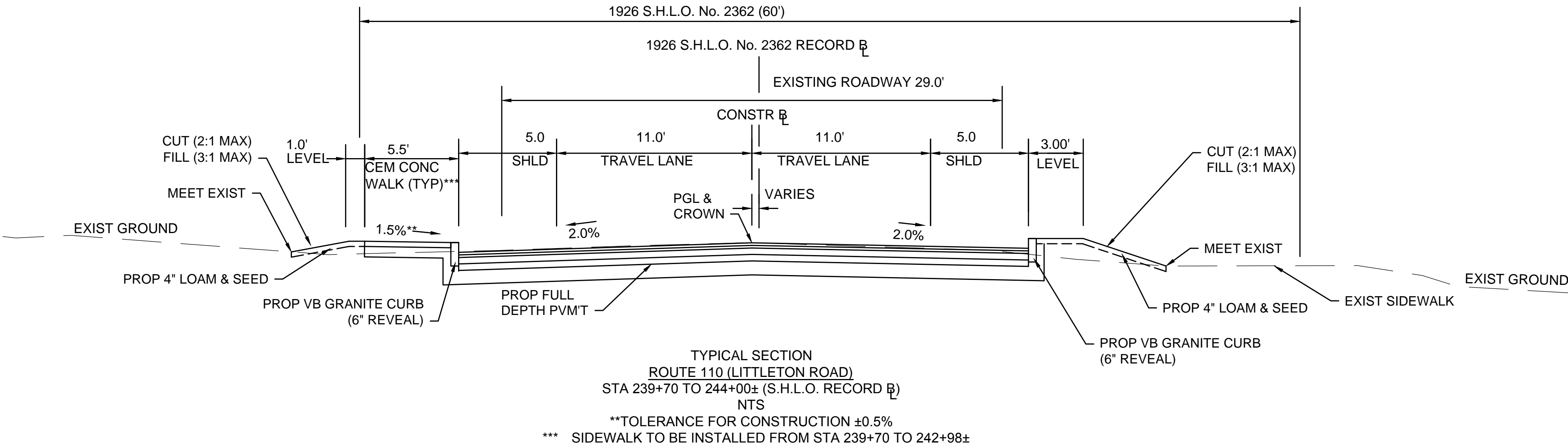


STA 225+40 TO 226+40± LT & STA 225+50 TO 226+00± RT
PROP STONE MASONRY RETAINING WALL SECTION
(STD E 302.2.0)
* SEE TYPICAL SECTION STA 225+00 TO 229+00±
(S.H.L.O. RECORD B)
NTS

WESTFORD RT 110 & TADMUCK ROAD			
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MA	TBD	6	40
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TYPICAL SECTIONS & PAVEMENT NOTES

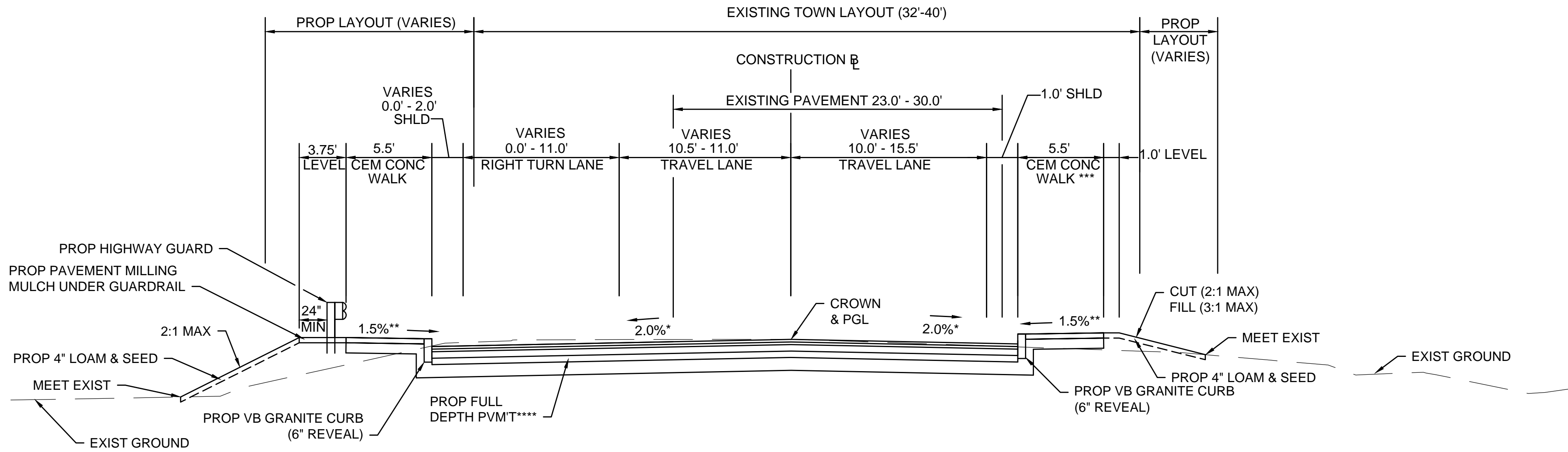
SEE SHEET 5
FOR PAVEMENT NOTES



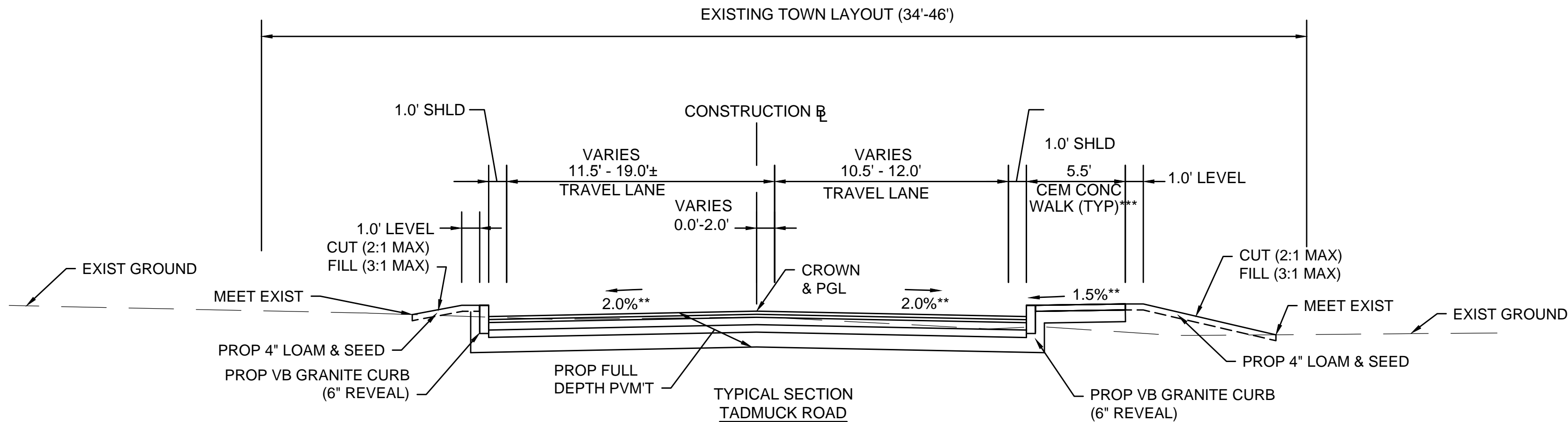
WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	7	40
PROJECT FILE NO. 607251			

TYPICAL SECTIONS & PAVEMENT NOTES

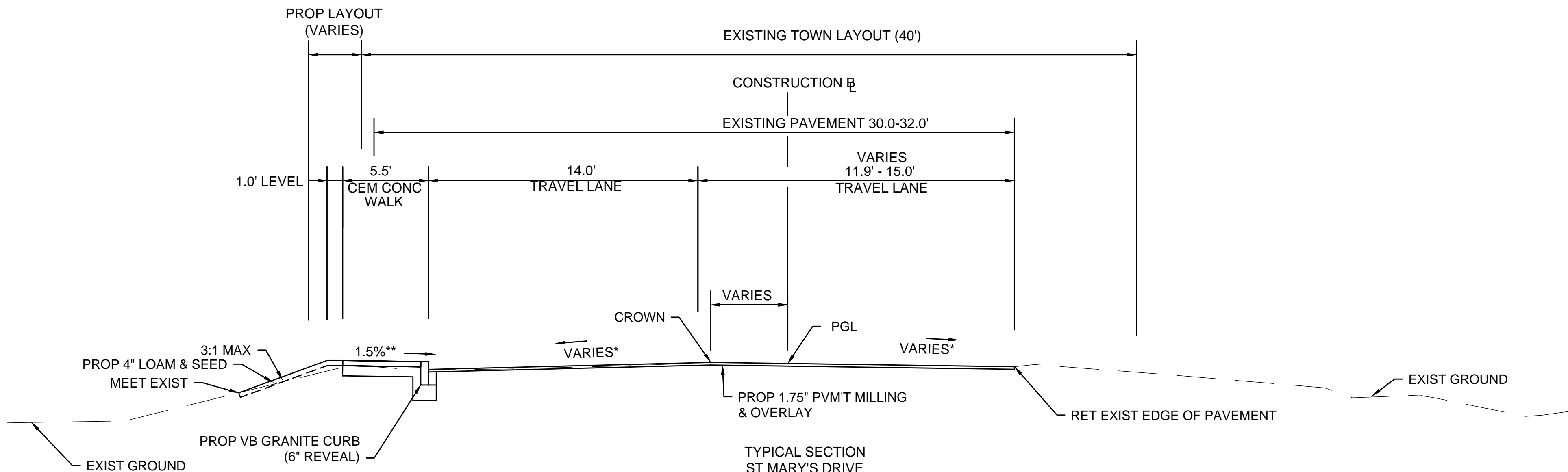
SEE SHEET 5
FOR PAVEMENT NOTES



TYPICAL SECTION
TADMUCK ROAD
STA 103+50 TO 107+60±
NTS
*MILL & OVERLAY CROSS SLOPE VARIES - FOLLOW EXISTING GROUND
**TOLERANCE FOR CONSTRUCTION ±0.5%
*** SIDEWALK TO BE INSTALLED FROM
STA 103+90± TO 105+88±
****PAVEMENT MILLING & OVERLAY FROM 105+14± TO 107+60±



TYPICAL SECTION
TADMUCK ROAD
STA 100+50 TO 103+50
NTS
**TOLERANCE FOR CONSTRUCTION ±0.5%
*** SIDEWALK TO BE INSTALLED FROM
STA 101+45± TO 103+25±



TYPICAL SECTION
ST MARY'S DRIVE
STA 200+00 TO 201+65±
NTS
*MILL & OVERLAY CROSS SLOPE VARIES - FOLLOW EXISTING GROUND
**TOLERANCE FOR CONSTRUCTION ±0.5%

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

SEE BELOW

DRAINAGE DETAILS

SEE BELOW

NOTE: ALL EXISTING UNDERGROUND UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED.

WESTFORD
RT 110 & TADMUCK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	8	40
PROJECT FILE NO.		607251	

CONSTRUCTION PLANS

N/F
REL G. DIAS
JOB, PAGE 262

N/F
MICHELSON FARM-WESTFORD TECH
PARK X LIMITED PARTNERSHIP
BOOK 10828, PAGE 127

ROUTE 110 (LITTLETON ROAD)

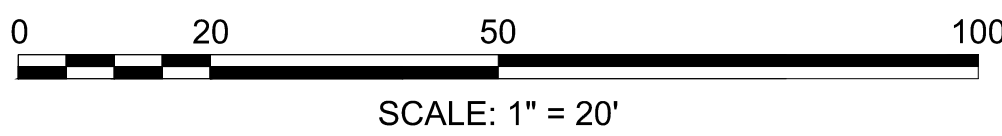
NEW ENG
MA
BOC

CONTINUED ON
SHEET NO. 9

N/F
NASHOBA VALLEY TECHNICAL
HIGH SCHOOL
MAP 23, PARCEL 2
BOOK 1892, PAGE 757

ST MARYS CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
200+00.00	3033493.8360	680542.3618	R=520.00' Δ=19°54'57" L=180.75' T=91.30'		201+80.75	3033343.1855	680640.5857

LITTLETON ROAD - CONSTRUCTION BL CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
239+87.70	3033685.2439	680799.2056		S51°41'11"W 150.73'	241+38.43	3033591.7963	680680.9382
241+38.43	3033591.7963	680680.9382	R=1600.00' Δ=12°43'10" L=355.19' T=178.33'		244+93.62	3033404.2005	680380.1838



FOR PROFILE SEE SHEETS 14 & 20

HIGHWAY GUARD DETAILS
HIGHWAY GUARD STA 236+03 RT
TO 105+50 LT
TANGENT END - VERMONT STYLE
STA 236+03 RT
TANGENT END TREATMENT
STA 105+50 LT

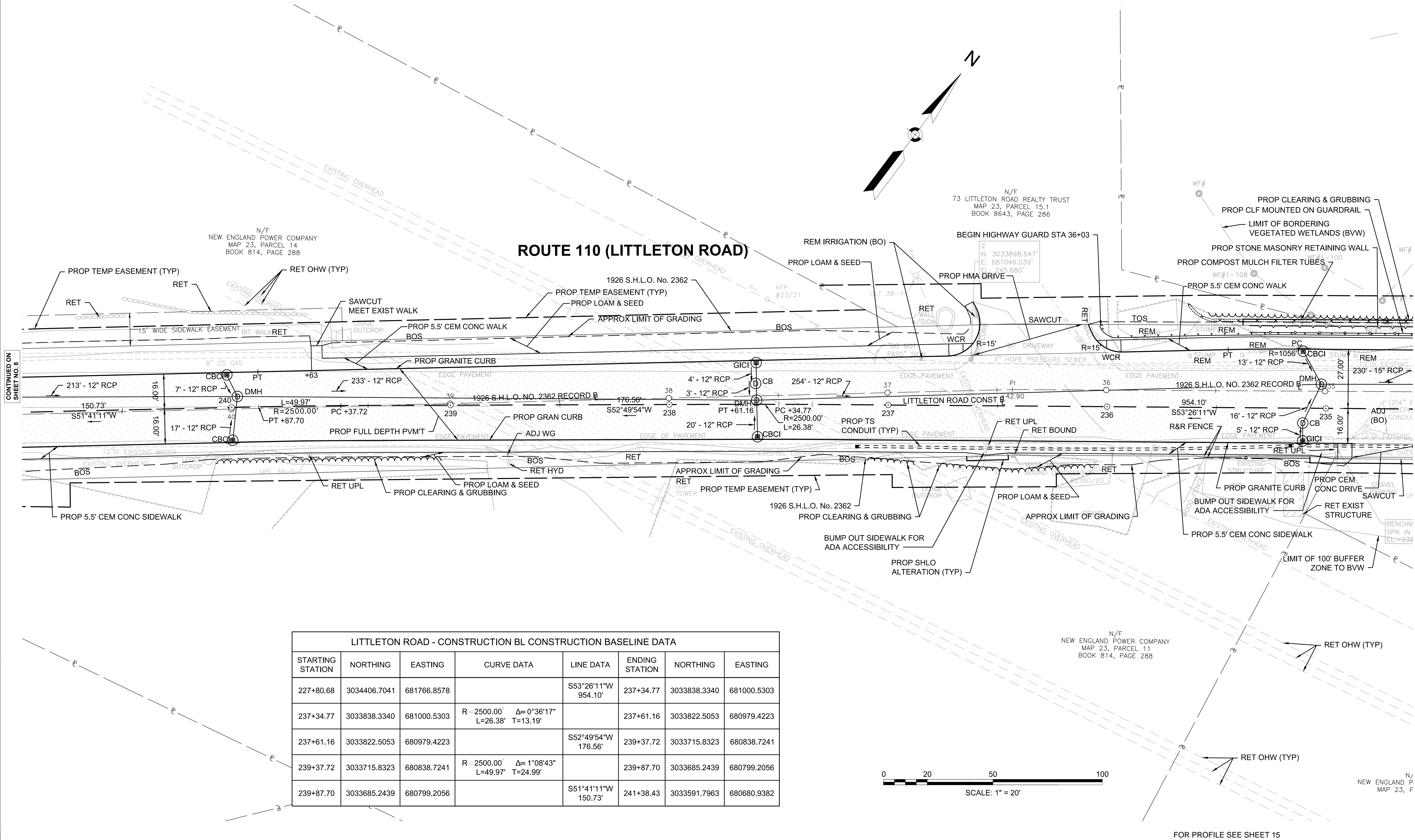
TRAFFIC SIGNAL CONDUIT
NONE

WATER SUPPLY ALTERATIONS
SEE BELOW

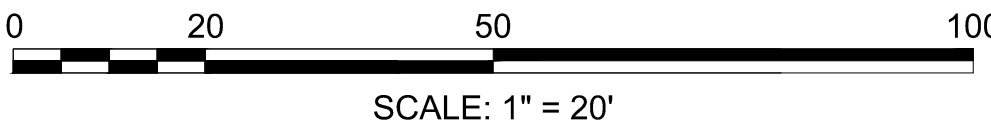
DRAINAGE DETAILS
SEE BELOW

NOTE: ALL EXISTING UNDERGROUND UTILITIES ARE
TO BE RETAINED UNLESS OTHERWISE NOTED.

WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	9	40
PROJECT FILE NO.		607251	
CONSTRUCTION PLANS			



LITTLETON ROAD - CONSTRUCTION BL CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
227+80.68	3034406.7041	681766.8578		S53°26'11"W 954.10'	237+34.77	3033838.3340	681000.5303
237+34.77	3033838.3340	681000.5303	R=2500.00' L=26.38' Δ=0°36'17" T=13.19'		237+61.16	3033822.5053	680979.4223
237+61.16	3033822.5053	680979.4223		S52°49'54"W 176.56'	239+37.72	3033715.8323	680838.7241
239+37.72	3033715.8323	680838.7241	R=2500.00' L=49.97' Δ=1°08'43" T=24.99'		239+87.70	3033685.2439	680799.2056
239+87.70	3033685.2439	680799.2056		S51°41'11"W 150.73'	241+38.43	3033591.7963	680680.9382



FOR PROFILE SEE SHEET 15

HIGHWAY GUARD DETAILS

HIGHWAY GUARD STA 236+03 RT
TO 105+50 LT
TANGENT END VERMONT STYLE
STA 236+03 RT
TANGENT END TREATMENT
STA 105+50 LT

TRAFFIC SIGNAL CONDUIT

SEE SHEET 23

WATER SUPPLY ALTERATIONS

SEE BELOW

DRAINAGE DETAILS

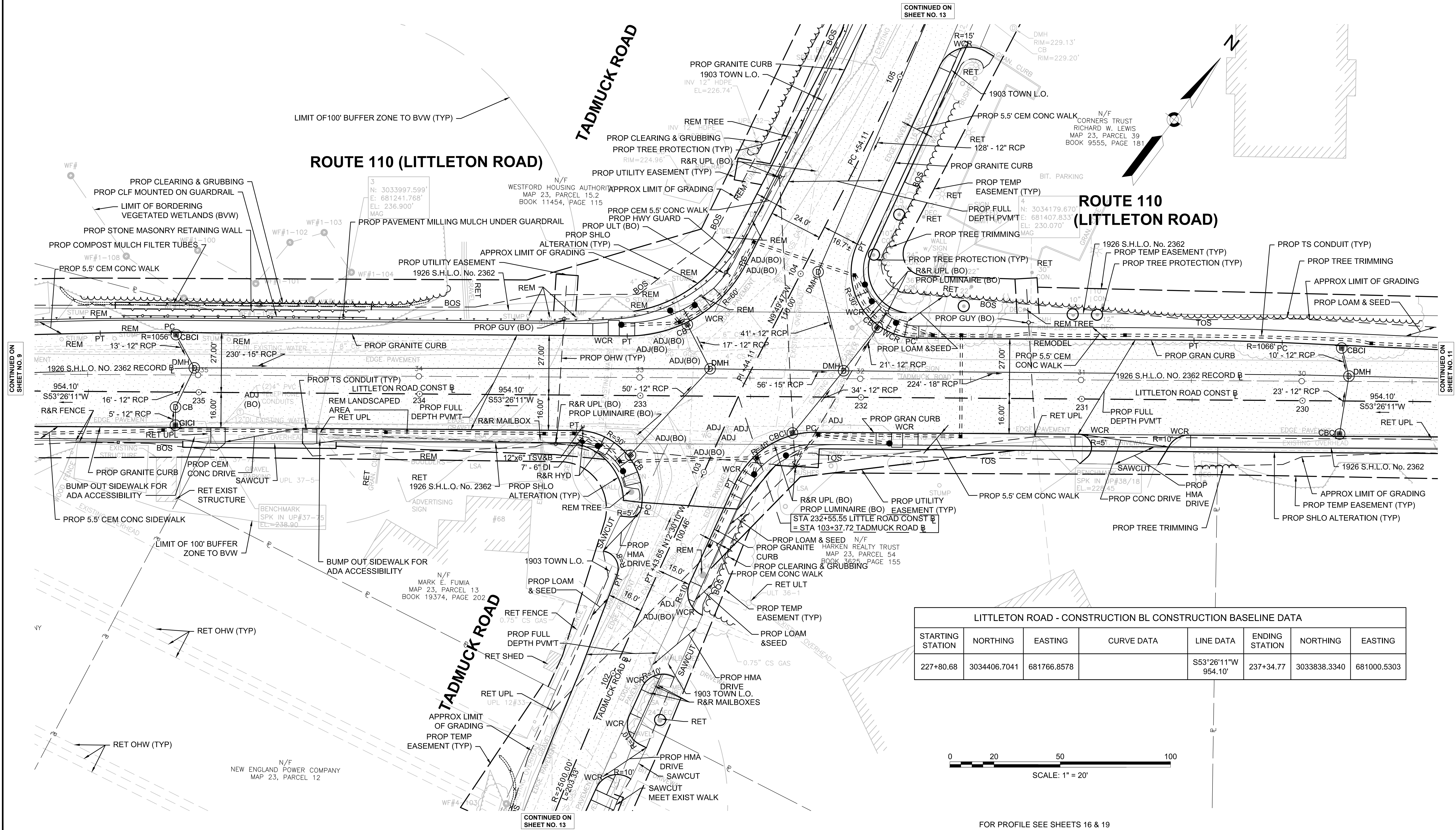
SEE BELOW

NOTE: ALL EXISTING UNDERGROUND UTILITIES ARE
TO BE RETAINED UNLESS OTHERWISE NOTED.

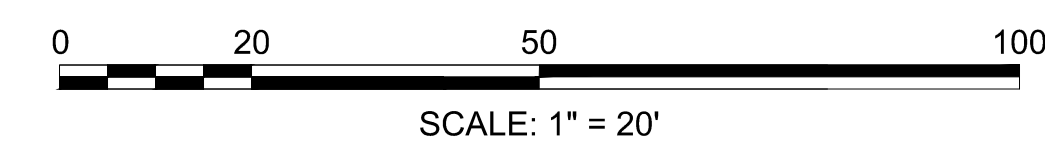
WESTFORD RT 110 & TADMUCK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	10	40
PROJECT FILE NO.		607251	

CONSTRUCTION PLANS



LITTLETON ROAD - CONSTRUCTION BL CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
227+80.68	3034406.7041	681766.8578		S53°26'11\"W 954.10'	237+34.77	3033838.3340	681000.5303



FOR PROFILE SEE SHEETS 16 & 19

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	11	40
PROJECT FILE NO.		607251	

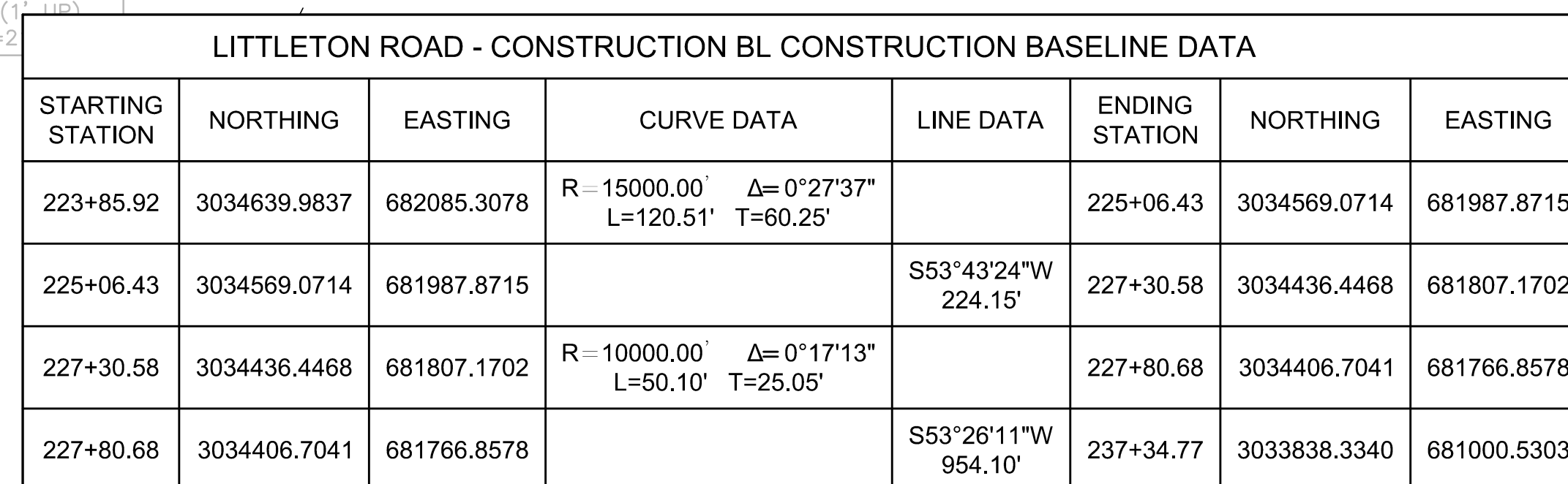
HIGHWAY GUARD STA 225+40
LT TO 228+07 LT
STA 225+00 TO 226+10 RT
TANGENT ENDS STA 225+40 LT,
STA 228+07 LT, 225+00 RT,
226+10 RT

NONE

SEE BELOW

SEE BELOW

ROUTE 110 (LITTLETON ROAD)



607251 HD(GEN) DWG Plotted on 10-Jun-2015 11:03 AM

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

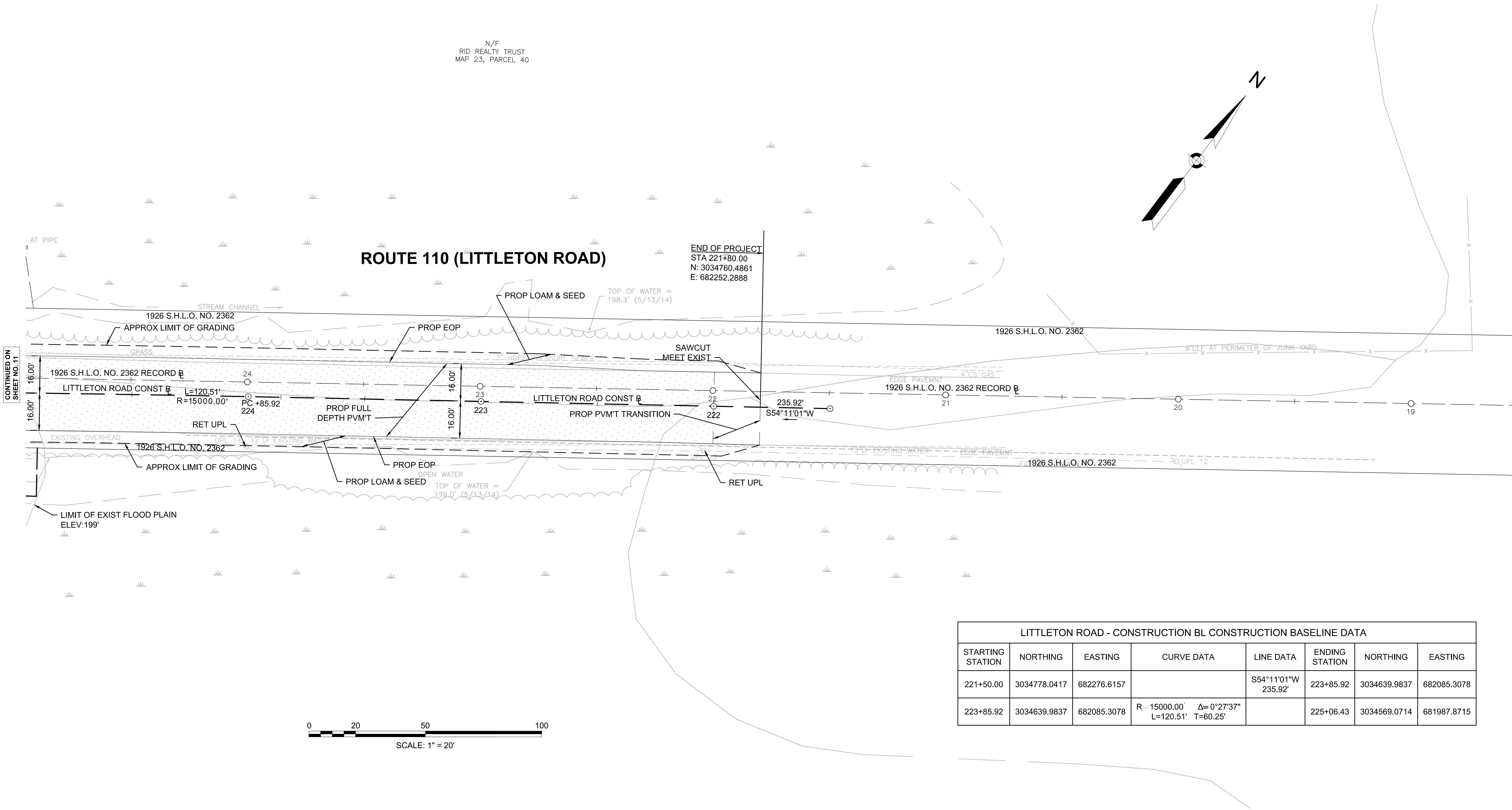
NONE

WESTFORD
RT 110 & TADMUCK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	12	40
PROJECT FILE NO.		607251	

CONSTRUCTION PLANS

NOTE: ALL EXISTING UNDERGROUND UTILITIES ARE TO BE RETAINED UNLESS OTHERWISE NOTED.



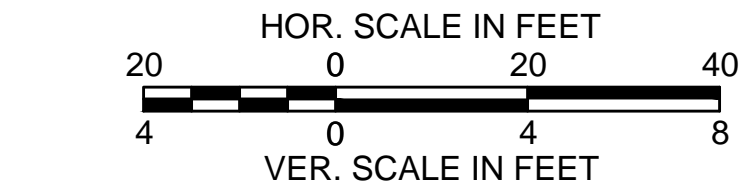
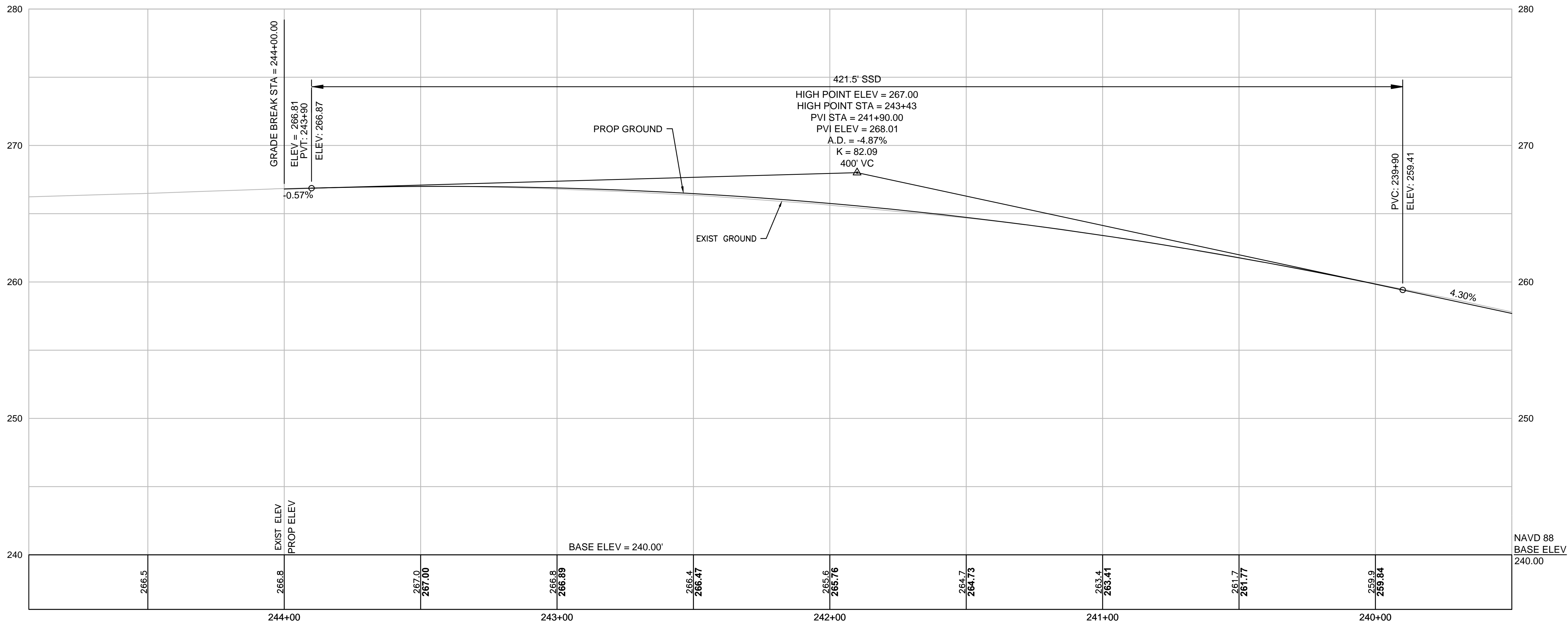
LITTLETON ROAD - CONSTRUCTION BL CONSTRUCTION BASELINE DATA							
STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
221+50.00	3034778.0417	682276.6157		S54°11'01"W 235.92'	223+85.92	3034639.9837	682085.3078
223+85.92	3034639.9837	682085.3078	R=15000.00' L=120.51' Δ=0°27'37" T=60.25'		225+06.43	3034569.0714	681987.8715

FOR PROFILE SEE SHEET 18

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	13	40
PROJECT FILE NO.		607251	

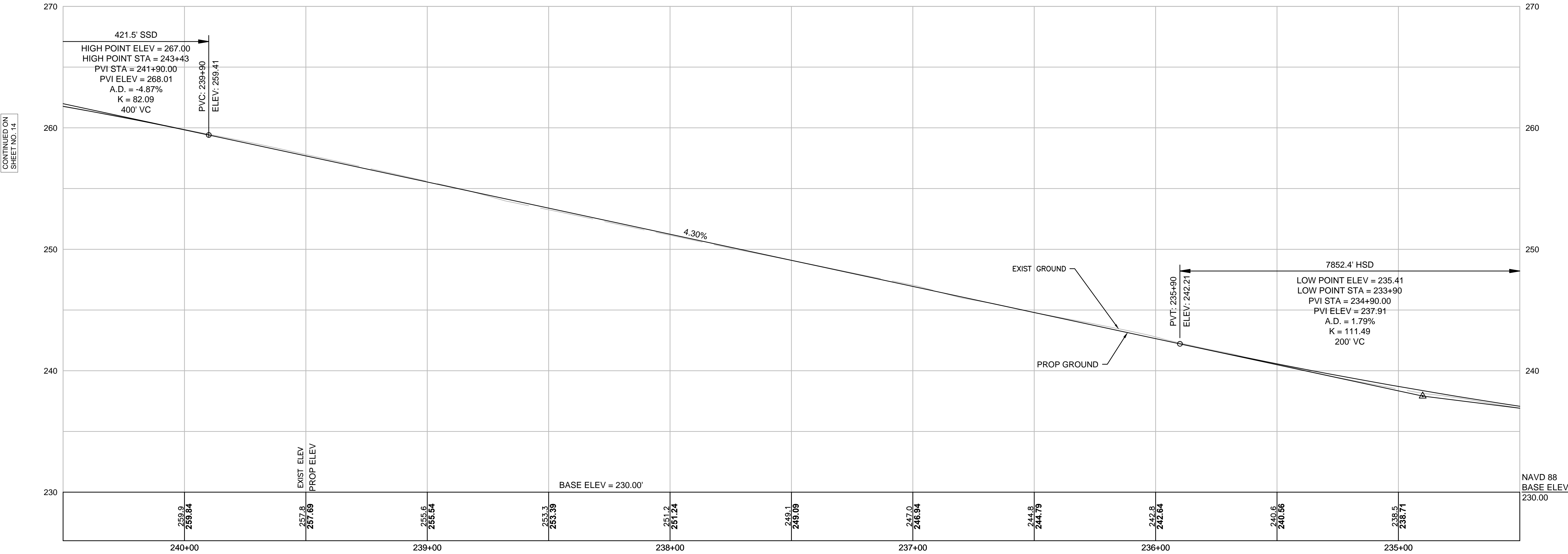
FOR PROFILE SEE SHEETS 19 & 20

LITTLETON ROAD - CONSTRUCTION BL

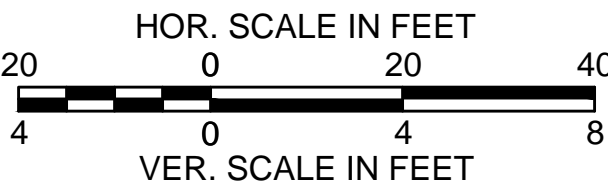


LITTLETON ROAD - CONSTRUCTION BL

WESTFORD			
RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	15	40
PROJECT FILE NO.		607251	
PROFILES			



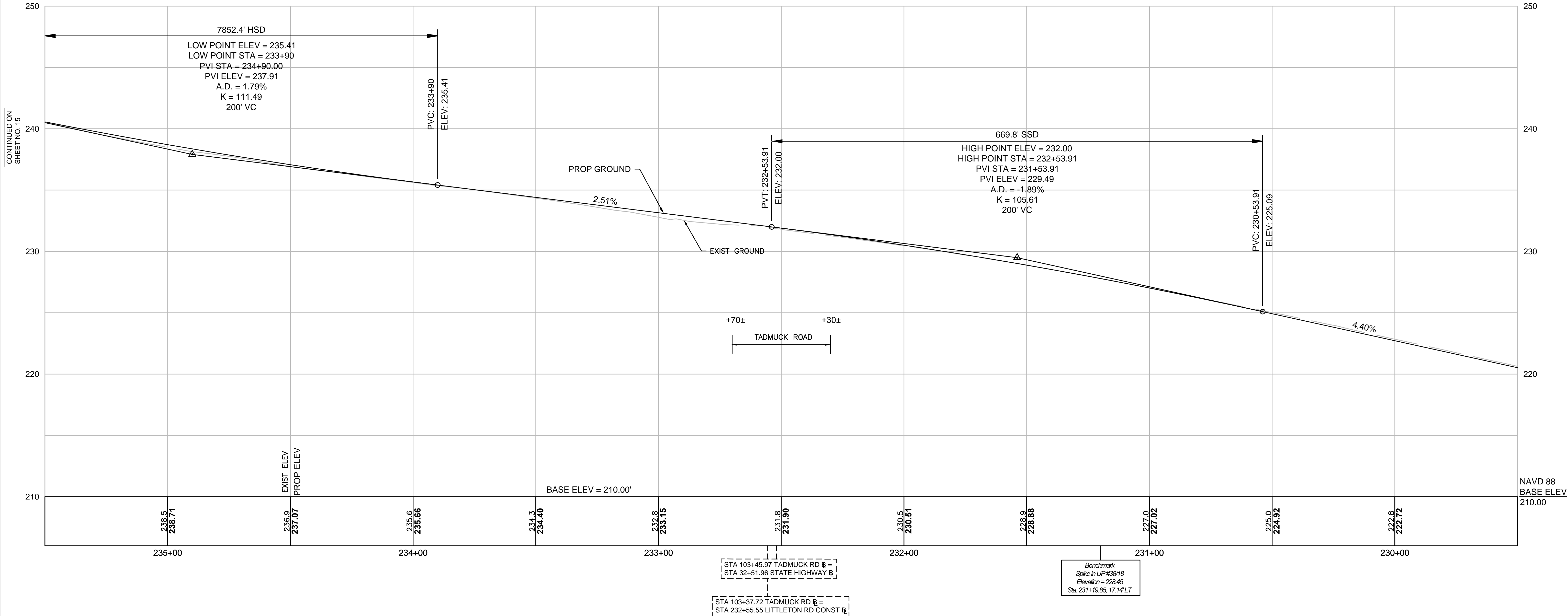
FOR CONSTRUCTION PLAN REFER TO SHEET 9



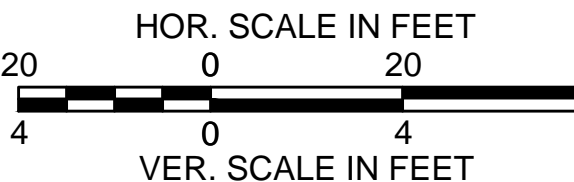
LITTLETON ROAD - CONSTRUCTION BL

WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	16	40
PROJECT FILE NO.		607251	

PROFILES

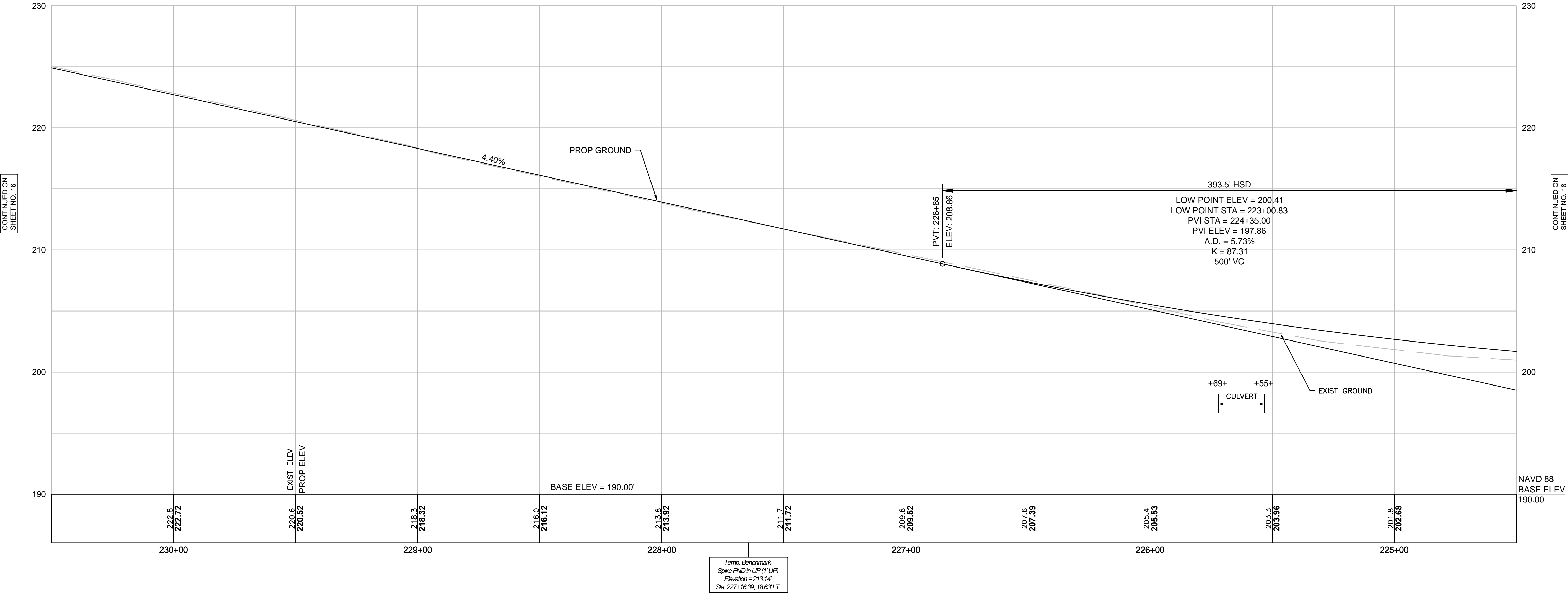


FOR CONSTRUCTION PLAN REFER TO SHEET

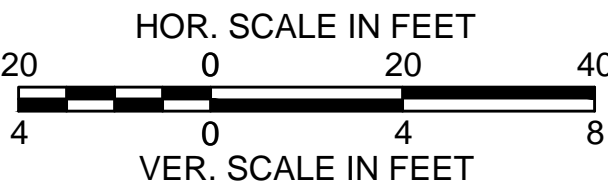


CONTINUED ON
SHEET NO. 17

LITTLETON ROAD - CONSTRUCTION BL

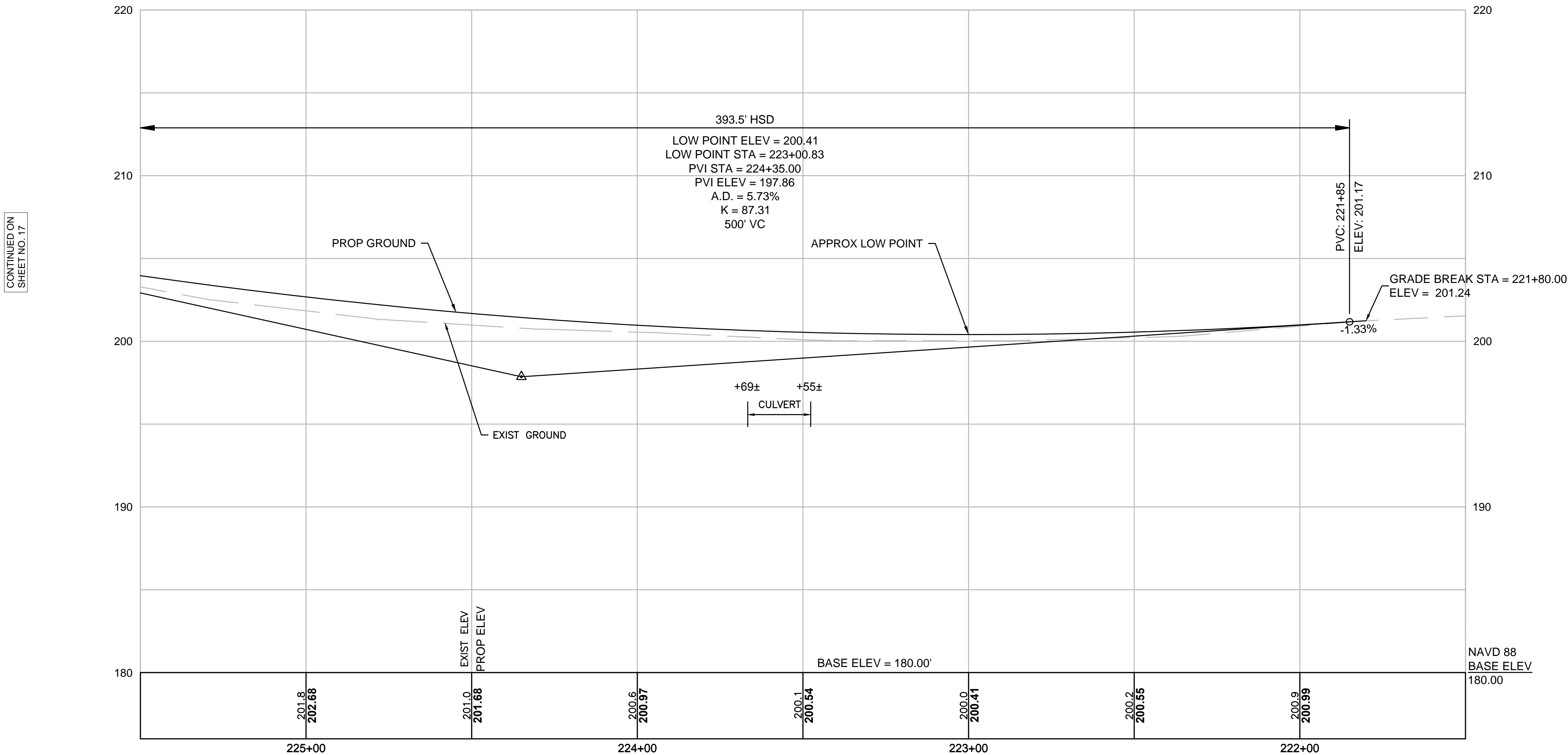


FOR CONSTRUCTION PLAN REFER TO SHEET 11

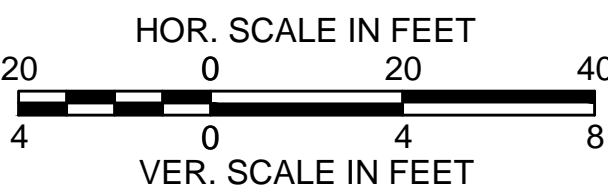


LITTLETON ROAD - CONSTRUCTION BL

WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	18	40
PROJECT FILE NO.		607251	
PROFILES			

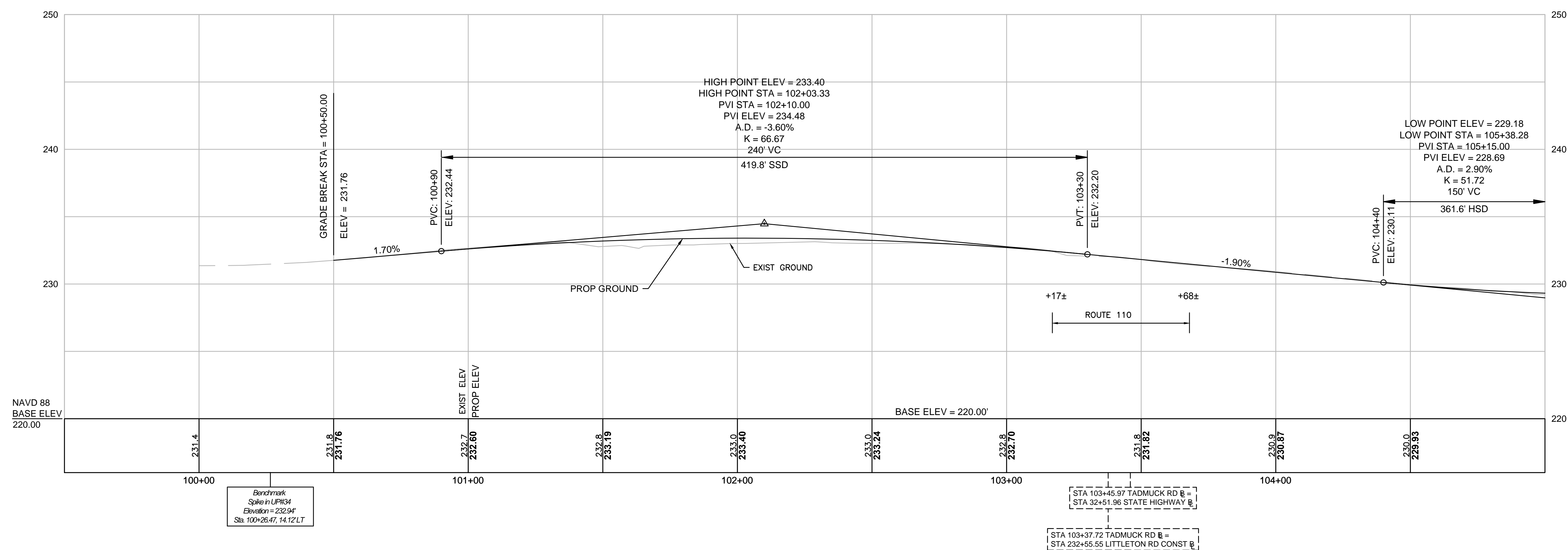


FOR CONSTRUCTION PLAN REFER TO SHEETS 11 & 12

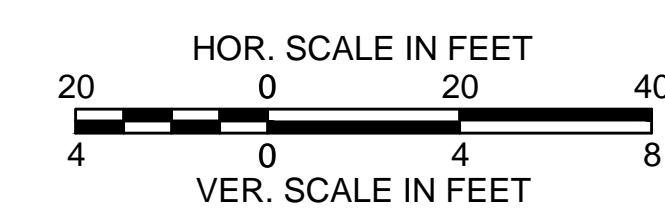


**WESTFORD
RT 110 & TADMUCK ROAD**

PROFILES



FOR CONSTRUCTION PLAN REFER TO SHEETS 10 & 13

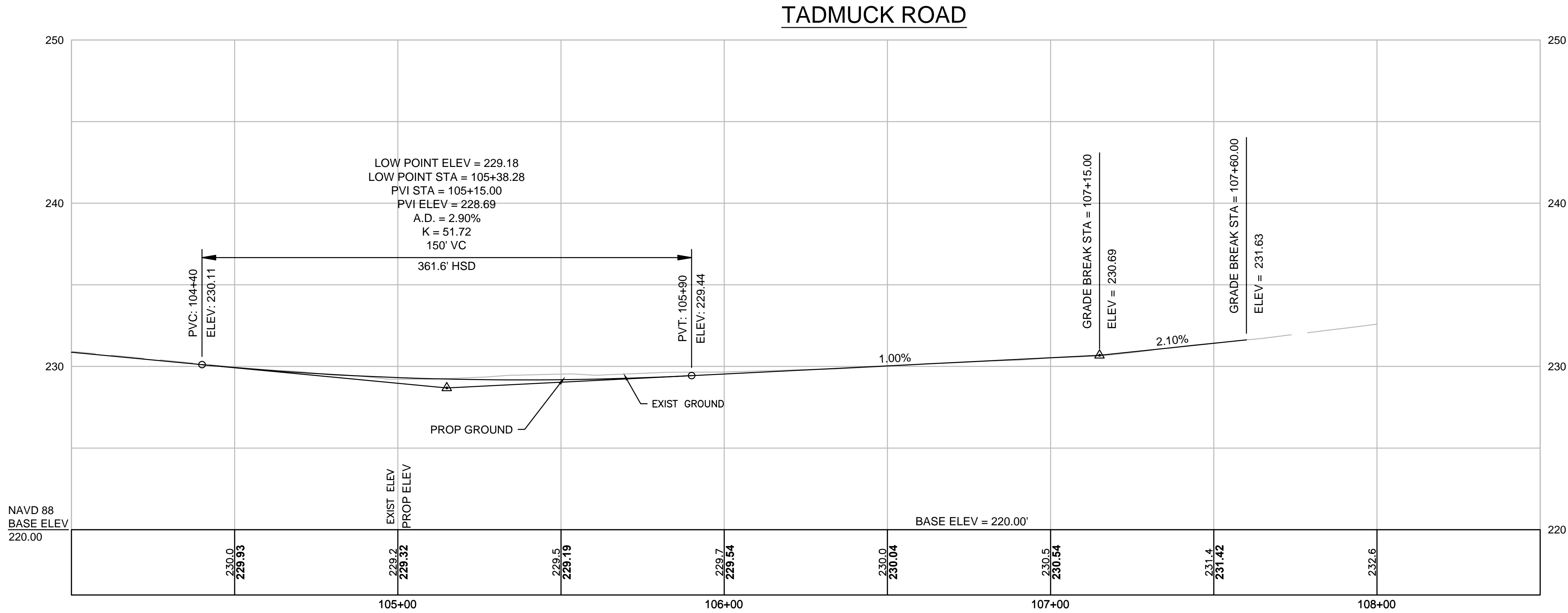


CONTINUED ON
SHEET NO. 20

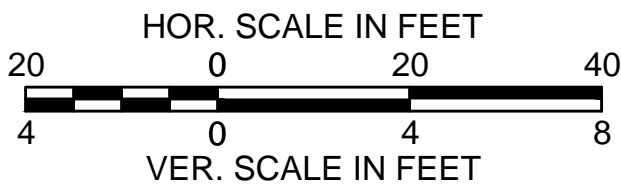
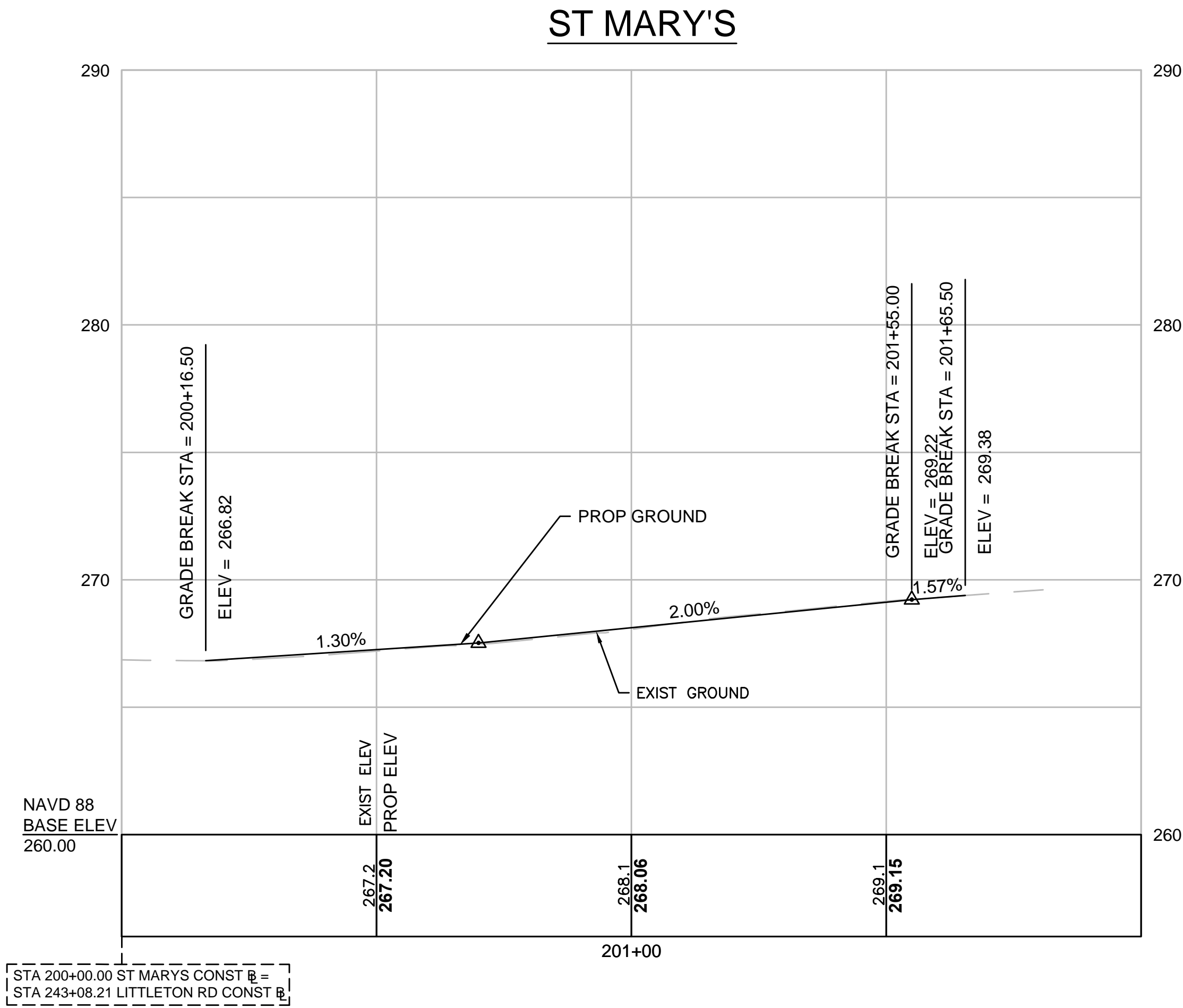
WESTFORD			
RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	20	40
PROJECT FILE NO.		607251	

PROFILES

CONTINUED ON
SHEET NO. 19



FOR CONSTRUCTION PLAN REFER TO SHEETS 8, 10 & 13



N/F
REL. G. DIAS
DOB, PAGE 262

N/F
MICHELSON FARM-WESTFORD TECH
PARK X LIMITED PARTNERSHIP
BOOK 10828, PAGE 127

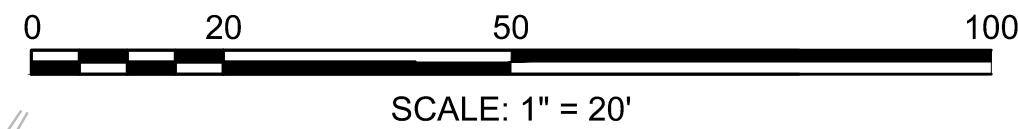
NEW ENG
MA
BOC

ROUTE 110 (LITTLETON ROAD)

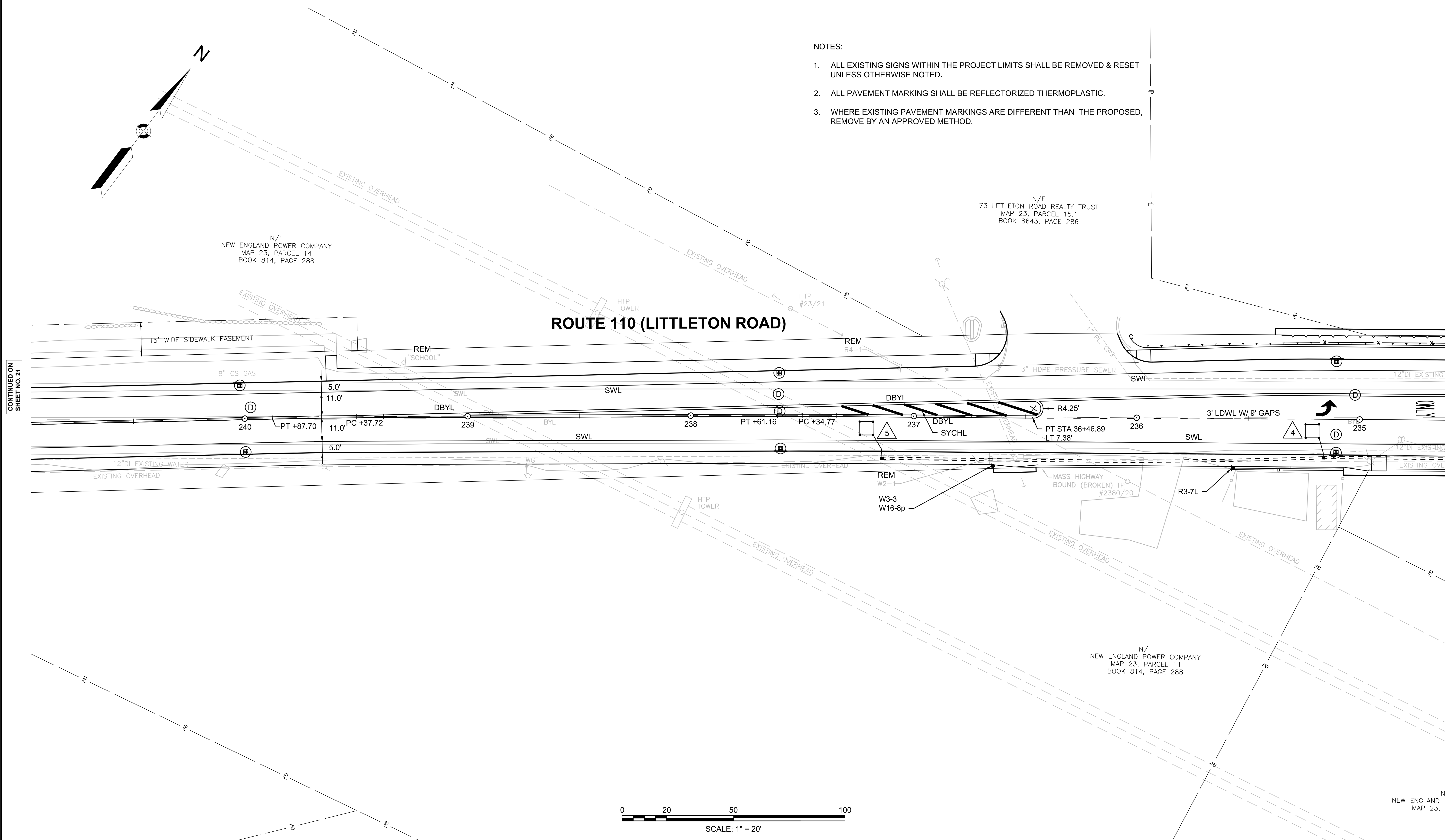
ST. MARYS DRIVE

NOTES:

- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED & RESET UNLESS OTHERWISE NOTED.
- ALL PAVEMENT MARKING SHALL BE REFLECTORIZED THERMOPLASTIC.
- WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN THE PROPOSED, REMOVE BY AN APPROVED METHOD.



N/F
NASHOBA VALLEY TECHNICAL
HIGH SCHOOL
MAP 23, PARCEL 2
BOOK 1892, PAGE 757



- NOTES:
- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED & RESET UNLESS OTHERWISE NOTED.
 - ALL PAVEMENT MARKING SHALL BE REFLECTORIZED THERMOPLASTIC.
 - WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN THE PROPOSED, REMOVE BY AN APPROVED METHOD.

N/F
REL. G. DIAS
008, PAGE 262

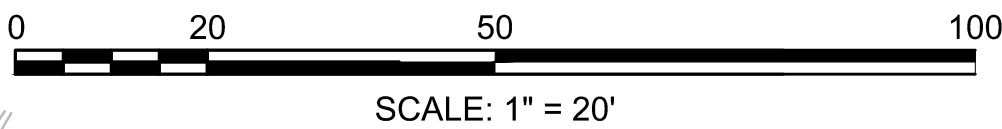
N/F
MICHELSON FARM-WESTFORD TECH
PARK X LIMITED PARTNERSHIP
BOOK 10828, PAGE 127

NEW ENG
MA
BOC

ROUTE 110 (LITTLETON ROAD)

NOTES:

- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED & RESET UNLESS OTHERWISE NOTED.
- ALL PAVEMENT MARKING SHALL BE REFLECTORIZED THERMOPLASTIC.
- WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN THE PROPOSED, REMOVE BY AN APPROVED METHOD.



N/F
NASHOBA VALLEY TECHNICAL
HIGH SCHOOL
MAP 23, PARCEL 2
BOOK 1892, PAGE 757

CONTINUED ON
SHEET NO. 22

WESTFORD
RT 110 & TADMUCK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	24	40
PROJECT FILE NO.		607251	

TRAFFIC PLANS

SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.

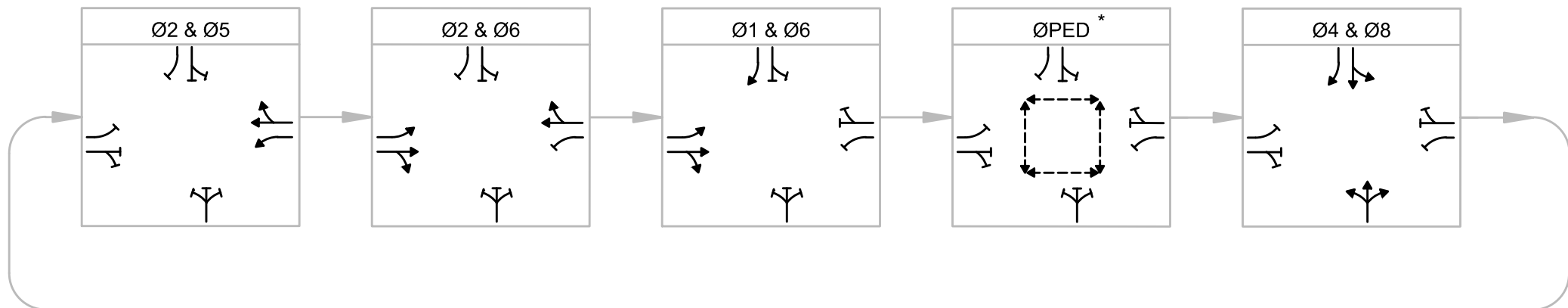
SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)

APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	FLASH
LITTLETON ROAD	EB	A	←G→	←Y→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←FY→	←Y→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←FR→
LITTLETON ROAD	EB	B	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
LITTLETON ROAD	WB	C	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←G→	←Y→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←R→	←FY→
LITTLETON ROAD	WB	D,E	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
TADMUCK ROAD	NB	F,G,H	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
TADMUCK ROAD	SB	J,K	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	FR
TADMUCK ROAD	SB	L	R←G→	R←Y→	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
TIMING IN SECONDS																								
MINIMUM GREEN (INITIAL)			6			10			6			6			10			6						
PASSAGE TIME (VEHICLE)			2			2			3			3			2			3						
MAXIMUM 1			X			45			X			X			45			X						
MAXIMUM 2			-			-			-			-			-			-						
YELLOW CLEARANCE				x			x			x			x			x			x			3		
RED CLEARANCE					x			x			x			x			x			x			0	
PEDESTRIAN WALK																					7			
PEDESTRIAN CLEARANCE																					19			
DETECTOR MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			LOCK			
RECALL			OFF			SOFT			OFF			OFF			SOFT			OFF			-			

- NOTES:
- AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED.
 - * UPON PEDESTRIAN PUSH BUTTON ACTUATION
 - PERM = PERMISSIVE
 - Ø4 & Ø8 DUAL ENTRY
 - MAXIMUM 1 = NORMAL OPERATION
 - MAXIMUM 2 = NOT USED
 - FLASHING YELLOW OPERATION SHALL CONFORM TO THE 2009 MUTCD.
 - STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
 - DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL NOT BE IN EFFECT.

CONFLICT FLASH
OPERATION ONLY

PREFERENTIAL PHASE SEQUENCE



* UPON PEDESTRIAN PUSH BUTTON ACTUATION

PRE-EMPTIONPHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1	↔↔	Ø1&Ø6
D2	2	↔↔	Ø2&Ø5
D3	3	↕↕	Ø4
D4	4	↕↕	Ø8

EMERGENCY VEHICLE PRE-EMPTION OPERATION

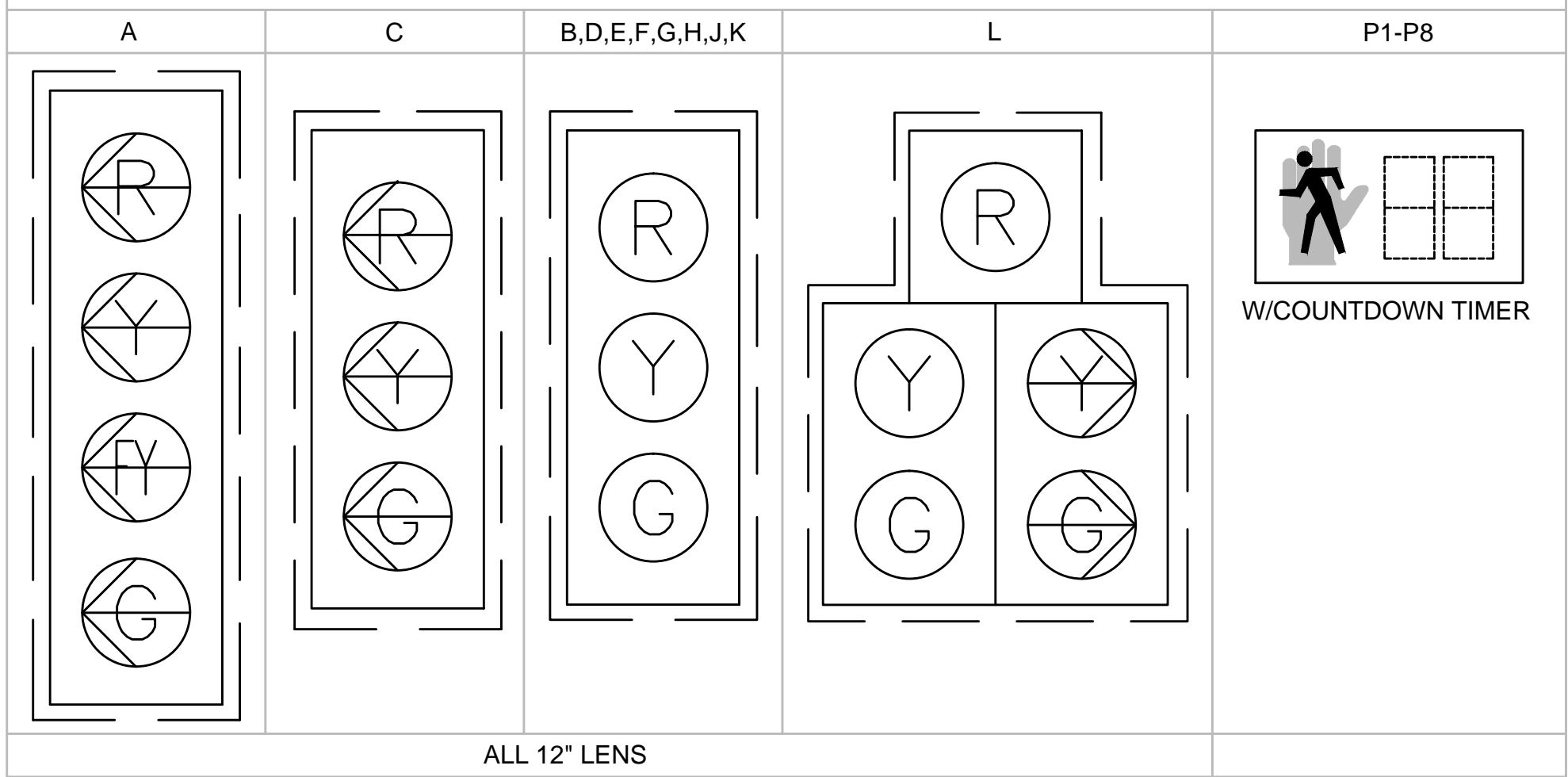
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

LOOP DETECTOR DATA

DETECTOR NO.	NO. SECTION/ SIZE	NO. OF TURNS	OPERATIONS	DELAY /EXT	CALL PHASE	LOOP CONNECTION
1	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø1	SERIES
2	1-6'X6'	3	PRESENCE	0	Ø6	SINGLE
3	1-6'X6'	3	PRESENCE	0	Ø6	SINGLE
4	1-6'X6'	3	PRESENCE	2 SEC EXTENSION	Ø6	SINGLE
5	1-6'X6'	3	PRESENCE	2 SEC EXTENSION	Ø6	SINGLE
6	1-4'X6' QUADRUPOLE	2-4-2	PRESENCE	0	Ø6	SINGLE
7	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø5	SERIES
8	1-6'X6'	3	PRESENCE	0	Ø2	SINGLE
9	1-6'X6'	3	PRESENCE	0	Ø2	SINGLE
10	1-6'X6'	3	PRESENCE	2 SEC EXTENSION	Ø2	SINGLE
11	1-6'X6'	3	PRESENCE	2 SEC EXTENSION	Ø2	SINGLE
12	1-4'X6' QUADRUPOLE	2-4-2	PRESENCE	0	Ø2	SINGLE
13	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø8	SERIES
14	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø4	SERIES
15	2-6'X20' QUADRUPOLE	2-4-2	PRESENCE	0	Ø4	SERIES

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY

SIGNAL HEAD DATA

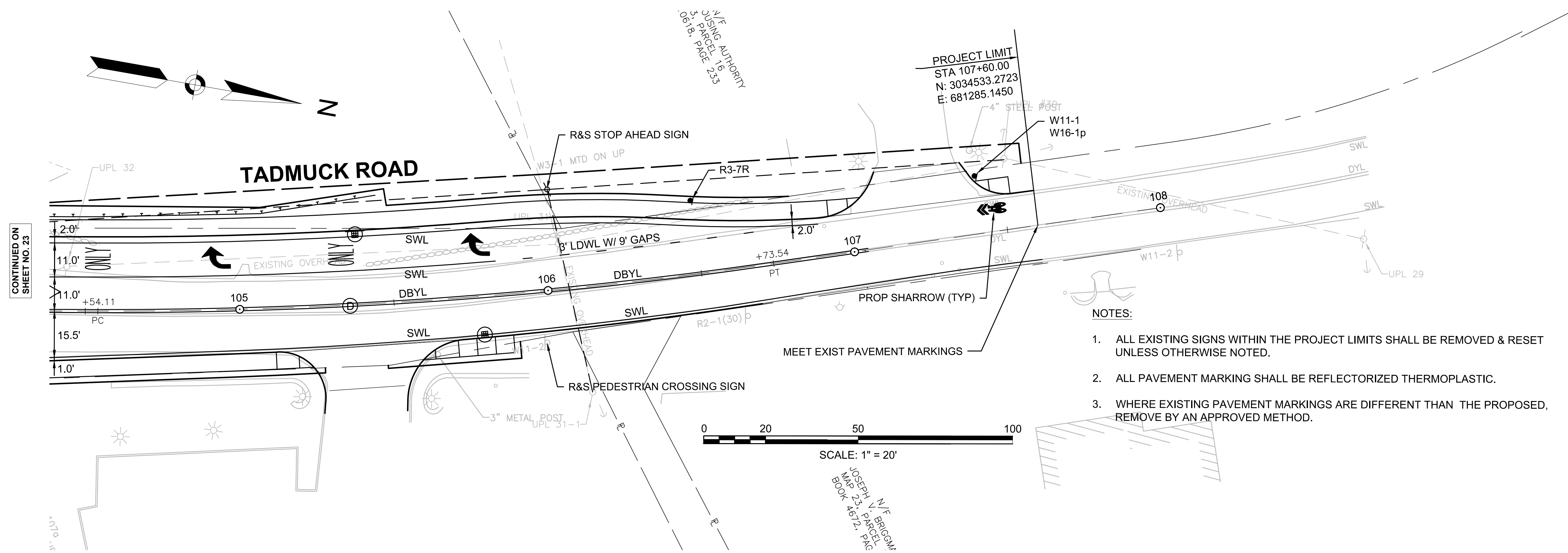
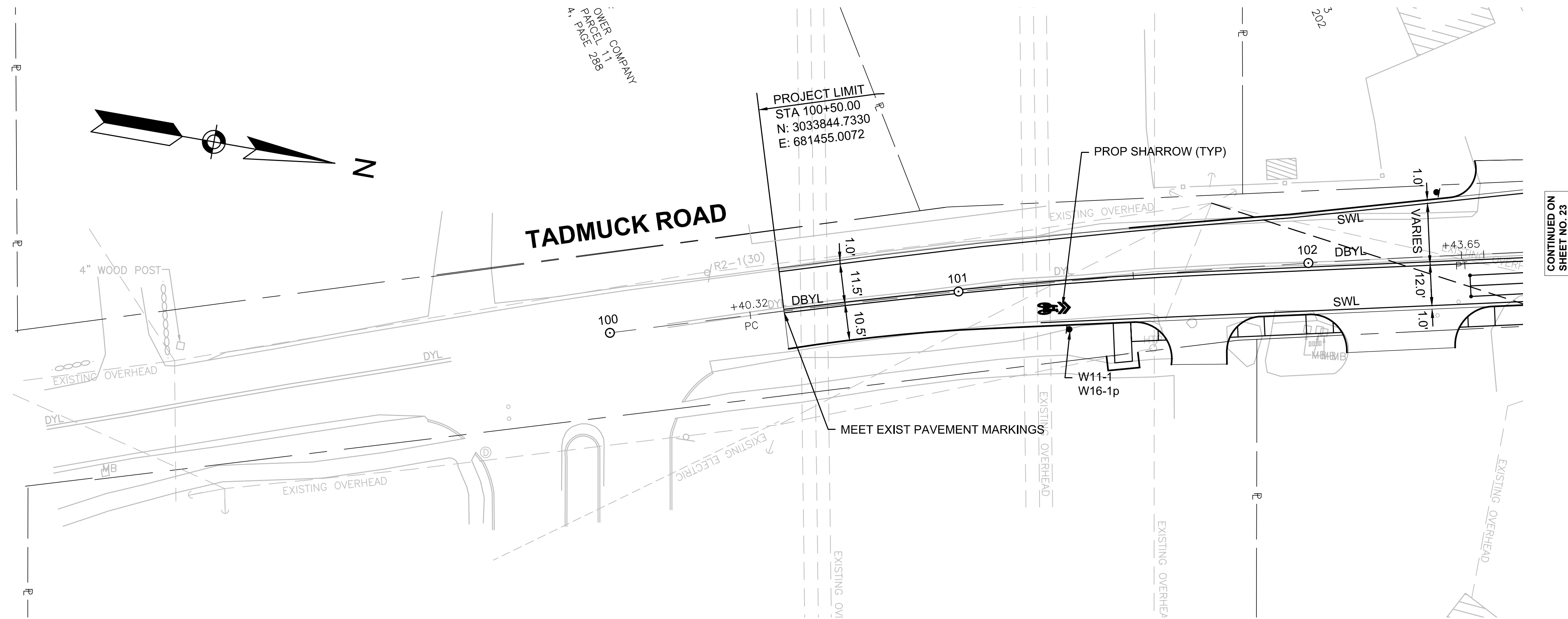


- NOTES:
- ALL SIGNAL HEADS SHALL BE RIGID MOUNTED.
 - ALL SIGNAL HEADS SHALL BE EQUIPPED WITH 5"± LOUVERED BACKPLATES. ALL BACKPLATES SHALL CONTAIN A 2" WIDE YELLOW REFLECTIVE BORDER.
 - ALL SIGNAL HEADS SHALL BE EQUIPPED WITH TUNNEL VISORS.
 - ALL SIGNAL DISPLAYS SHALL BE EQUIPPED WITH L.E.D. MODULES.







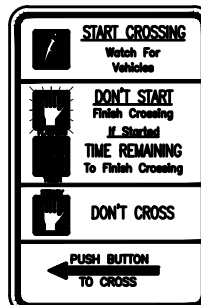
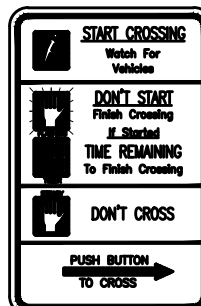

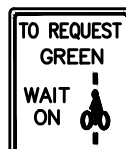



LIST OF MAJOR ITEMS REQUIRED



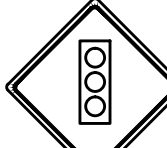






LITTLETON ROAD (ROUTE 110) AT TADMUCK ROAD		
PAY ITEM	QUANTITY	DESCRIPTION
815.1	1	ØØ TS 2 TYPE 1 CONTROLLER IN A TYPE 6 BASE MOUNTED CABINET INCLUDING FOUNDATION AND CONCRETE PAD
	1	TS 25' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
	3	TS 30' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
	7	TS POST 8' STANDARD INCL. FOUNDATION
	9	SIGNAL HEAD, 3-SECTION, 12" LENSES
	1	SIGNAL HEAD, 4-SECTION, 12" LENSES
	1	SIGNAL HEAD, 5-SECTION, 12" LENSES
	8	PEDESTRIAN SIGNAL HEAD (L.E.D.)
	4	PEDESTRIAN PUSH BUTTON W/R10-3e(L) AND SIGN SADDLE
	4	PEDESTRIAN PUSH BUTTON W/R10-3e(R) AND SIGN SADDLE
	8	TYPE C, 2-CHANNEL CARD RACK LOOP DETECTOR AMPLIFIER
	20	WIRE LOOP DETECTOR
	4	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
	1	EMERGENCY PRE-EMPTION 4 CHANNEL PHASE SELECTOR
	1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
	1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
	1	SERVICE CONNECTION (OVERHEAD)
	18	PULL BOX-12"x12"
	1350'	3" SCHEDULE 80 CONDUIT, TYPE NM

PLUS NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.



- NOTES:
- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED & RESET UNLESS OTHERWISE NOTED.
 - ALL PAVEMENT MARKING SHALL BE REFLECTORIZED THERMOPLASTIC.
 - WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN THE PROPOSED, REMOVE BY AN APPROVED METHOD.

TRAFFIC SIGN SUMMARY													
IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK- GROUND	LEGEND	BORDER			
R2-1(40)	24"	30"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED				WHITE	BLACK	BLACK		5.00	
R2-1(45)	24"	30"						WHITE	BLACK	BLACK		5.00	
R3-5L	30"	36"						WHITE	BLACK	BLACK		7.50	
R3-7L	30"	30"						WHITE	BLACK	BLACK		6.25	
R3-7R	30"	30"						WHITE	BLACK	BLACK		6.25	
R4-1	24"	30"						WHITE	BLACK	BLACK		5.00	
R10-3e(L)	9"	15"						WHITE	WHITE/ BLACK/ ORANGE	BLACK		INCLUDED UNDER ITEM 815.1	
R10-3e(R)	9"	15"						WHITE	WHITE/ BLACK ORANGE	BLACK		INCLUDED UNDER ITEM 815.1	
R10-12A	24"	36"						WHITE	BLACK/ YELLOW	BLACK		6.00	
R10-22	18"	24"		AS PER MASSDOT STANDARD				WHITE	BLACK	BLACK		3.00	
M1-5(110)	30"	24"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED				WHITE	BLACK	BLACK		5.00	
M3-2	24"	12"						WHITE	BLACK	BLACK		2.00	
M3-4	24"	12"						WHITE	BLACK	BLACK		2.00	

TRAFFIC SIGN SUMMARY													
IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK- GROUND	LEGEND	BORDER			
S1-1	36"	36"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED				FLUOR- ESCENT YELLOW- GREEN	BLACK	BLACK		9.00	
S4-3p	24"	8"						FLUOR- ESCENT YELLOW- GREEN	BLACK	BLACK		1.33	
W3-3	30"	30"						YELLOW	BLACK	BLACK		6.25	
W11-1	30"	30"						YELLOW	BLACK	BLACK		6.25	25.00
W16-1p	18"	24"						YELLOW	BLACK	BLACK		3.00	12.00
W16-8p	VARIES	8"						YELLOW	BLACK	BLACK			
W16-9p	24"	12"						FLUOR- ESCENT YELLOW- GREEN	BLACK	BLACK		2.00	
D3-1	VARIES	24"		12"/9"	6" 6"	N/A		GREEN	WHITE	WHITE		INCLUDED UNDER ITEM 874	
D3-2	VARIES	24"		12"/9"	6" 6"	N/A		GREEN	WHITE	WHITE		INCLUDED UNDER ITEM 874	

NOTES:
1. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE MASSDOT SIGN LISTINGS 1993 EDITION, AS AMENDED.

TEMPORARY TRAFFIC CONTROL PLAN GENERAL NOTES

1.

ALL CONSTRUCTION SIGNING, TEMPORARY TRAFFIC CONTROL DEVICES, AND ROADSIDE ELEMENTS SHALL CONFORM WITH THE LATEST VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) WITH MASSACHUSETTS STATE AMENDMENTS; THE LATEST REVISIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), ROADSIDE DESIGN GUIDE; AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS; AND NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
2.

ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB) AND AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) REQUIREMENTS.
3.

WORK HOURS SHALL BE 9:00AM TO 4:00PM MONDAY THRU FRIDAY UNLESS OTHERWISE APPROVED BY THE ENGINEER. WORK SHALL NOT AFFECT TRAFFIC PATTERNS DURING PEAK TRAFFIC PERIODS. PEAK TRAFFIC PERIODS ARE DEFINED AS MONDAY THRU FRIDAY 7:00AM-9:00AM AND 4:00PM-6:00PM.
4.

ALL DRUMS SHALL BE SET AT 20' ON CENTER MAX. ON LOCAL ROADWAY AND 50' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
5.

ALL DRUMS AND SIGNS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY AS APPROVED BY THE ENGINEER TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS AND OTHER TRAFFIC CONTROL DEVICES, GRADING AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR AND EMERGENCY TRAFFIC THROUGH THE WORK AREAS, BOTH DURING AND AFTER WORKING HOURS, TO MAINTAIN SUCH ACCESS.
6.

THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS.
7.

FOR RESTORATIVE WORK ON TADMUCK ROAD, A MINIMUM OF ONE LANE OF TRAFFIC IN EACH DIRECTION ON TWO WAY STREETS SHALL BE MAINTAINED AT ALL TIMES, EXCEPT THAT DURING WORKING HOURS, TRAFFIC MAY BE REDUCED TO ONE LANE UNDER POLICE CONTROL FOR SHORT TIME PERIODS WHEN REQUIRED FOR THE WORK, AS SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.
8.

GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
9.

EXCAVATION EDGES IN EXCESS OF 4 INCHES DEEP SHALL BE PROTECTED DURING NON-WORKING HOURS BY BACKFILLING WITH A WEDGE OF COMPACTED GRAVEL BORROW AT A 4:1 SLOPE PER THE DETAIL SHOWN. EXCAVATIONS IN EXCESS OF 2 FEET SHOULD BE PROTECTED BY A MASSDOT APPROVED TEMPORARY CONCRETE BARRIER WITH A MINIMUM LEVEL LATERAL OFFSET OF 3 FEET FROM THE EDGE OF EXCAVATION. BARRIER PLACED WITH LESS THAN THE RECOMMENDED LATERAL OFFSET TO THE EDGE OF EXCAVATION SHALL BE ANCHORED/RESTRAINED TO PREVENT LATERAL MOVEMENT WHEN STRUCK BY ERRANT VEHICLES TRAVELING AT THE POSTED SPEED.
10.

THE CONTRACTOR SHALL PROVIDE TEMPORARY IMPACT ATTENUATORS TO PROTECT ALL BLUNT-ENDS OF TEMPORARY CONCRETE BARRIER OR AS REQUIRED ON THE TRAFFIC MANAGEMENT PLANS. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO THE START OF WORK. ALL TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED FOR TEST LEVEL 2 (TL-2) ON ALL ROADWAYS HAVING A POSTED SPEED LESS THAN 45MPH AND TEST LEVEL 3 (TL-3) ON ROADWAYS HAVING A POSTED SPEED IN EXCESS OF 45MPH.
11.

11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED.
12.

TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
13.

ADVISORY SPEED PLATES (W13-1p) SHALL BE USED IF APPROPRIATE AND AS REQUESTED BY THE ENGINEER. ADVISORY SPEED SHALL BE AS ESTABLISHED BY THE MASSDOT DISTRICT 3 OFFICE.
14.

SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
15.

SIGNS INSTALLED ON PORTABLE STANDS PLACED AMONG CHANNELIZATION DEVICES REQUIRE A 36 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
16.

SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
17.

W20-7b SIGNS SHALL BE REPLACED BY W20-7 SIGNS WHEN FLAGGERS ARE USED IN LIEU OF POLICE OFFICER DETAILS.
18.

TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT.
19.

THE FIRST 5 REFLECTORIZED DRUMS ON TAPERS AND AT ROADWAY CLOSURE LOCATIONS SHALL BE EQUIPPED WITH TYPE A (FLASHING) LIGHTS FOR NIGHT-TIME OPERATIONS.
20.

REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
21.




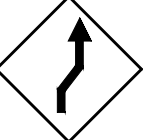
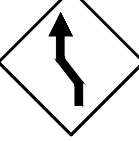













CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
22.

W20-8a SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF AREAS WHERE UTILITY CASTINGS HAVE BEEN RAISED IN ADVANCE OF PAVING OPERATIONS OR AS REQUESTED BY THE ENGINEER.
23.

W8-15 SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.
24.

THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.

TEMPORARY TRAFFIC CONTROL SIGNS

IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	COLOR		
	WIDTH	HEIGHT		BACK- GROUND	LEGEND	BORDER
R2-10a	36"	48"		WHITE	BLACK	BLACK
R2-10e	36"	48"		ORANGE WHITE	BLACK BLACK	BLACK BLACK
R4-7b	24"	30"		WHITE	BLACK	BLACK
W1-4R	30"	30"		ORANGE	BLACK	BLACK
W1-4L	30"	30"		ORANGE	BLACK	BLACK
W3-4	36"	36"		ORANGE	BLACK	BLACK
W5-1	36"	36"		ORANGE	BLACK	BLACK
W8-3	36"	36"		ORANGE	BLACK	BLACK
W8-8	30"	30"		ORANGE	BLACK	BLACK
W8-15	30"	30"		ORANGE	BLACK	BLACK
W13-1(XX)	18"	18"		ORANGE	BLACK	BLACK
W20-1a	36"	36"		ORANGE	BLACK	BLACK
W20-1b	36"	36"		ORANGE	BLACK	BLACK
W20-1c	36"	36"		ORANGE	BLACK	BLACK
W20-4	36"	36"		ORANGE	BLACK	BLACK
W20-7	36"	36"		ORANGE	BLACK	BLACK
W20-7b	36"	36"		ORANGE	BLACK	BLACK
W20-8a	36"	36"		ORANGE	BLACK	BLACK

NOTE: THE CONTRACTOR SHALL COVER ANY ADVANCE SIGNAGE IF THE SIGNAGE FROM A DAILY OPERATIONAL SETUP INTERFERES WITH THE ADVANCE SIGNING.

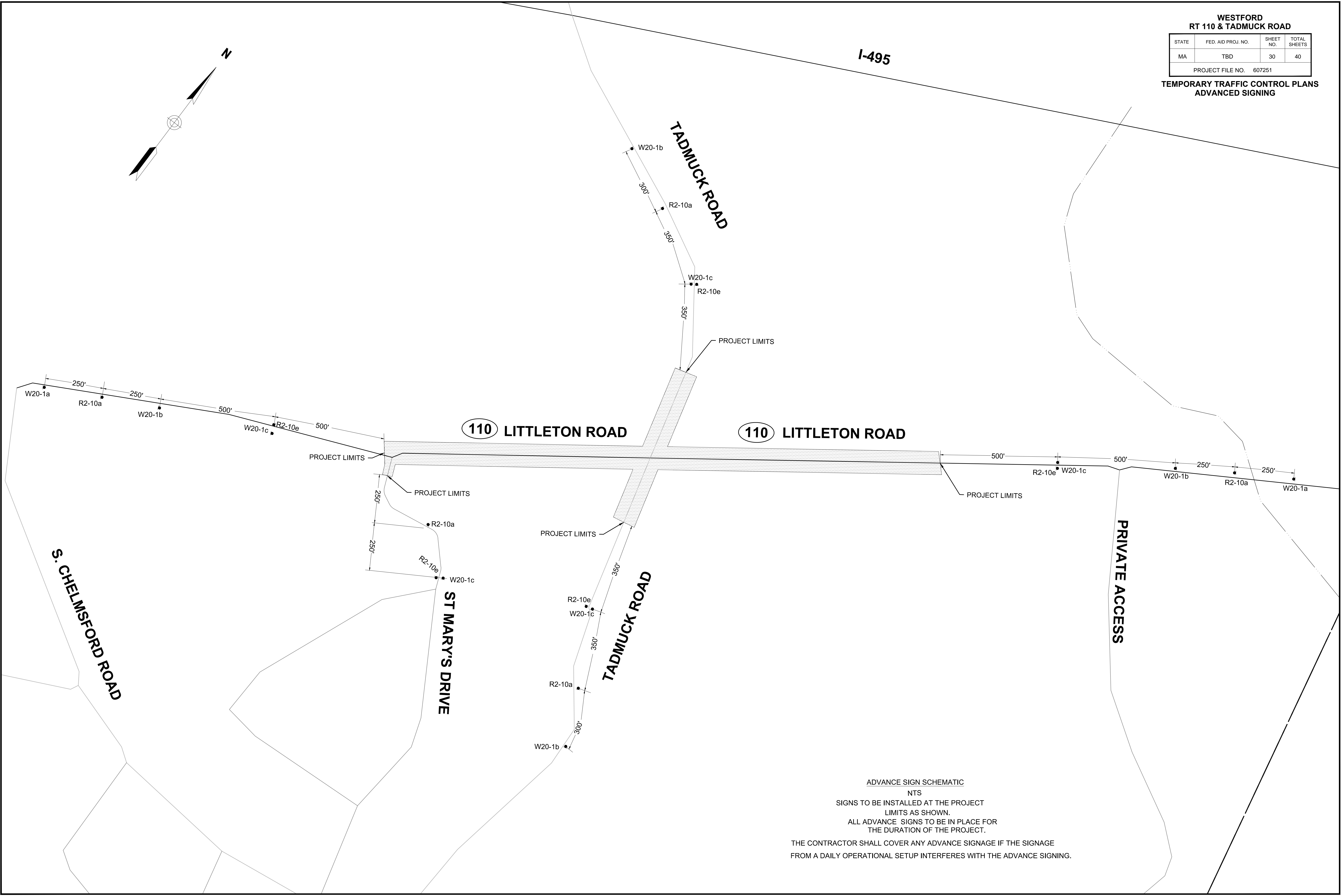
WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	29	40
PROJECT FILE NO. 607251			

TEMPORARY TRAFFIC CONTROL PLANS

WESTFORD
RT 110 & TADMUCK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	30	40
PROJECT FILE NO. 607251			

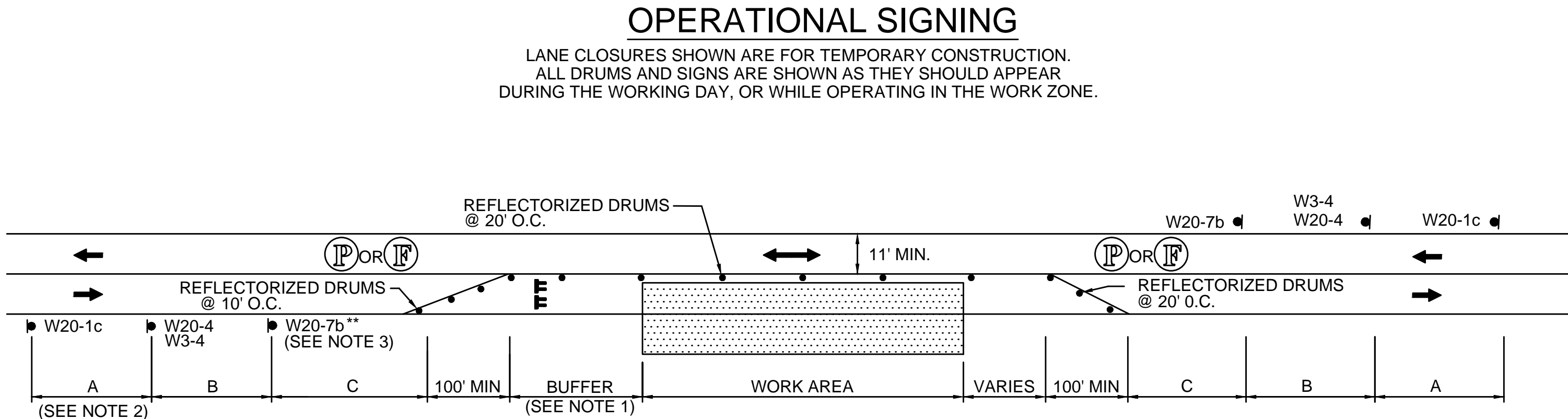
TEMPORARY TRAFFIC CONTROL PLANS
ADVANCED SIGNING



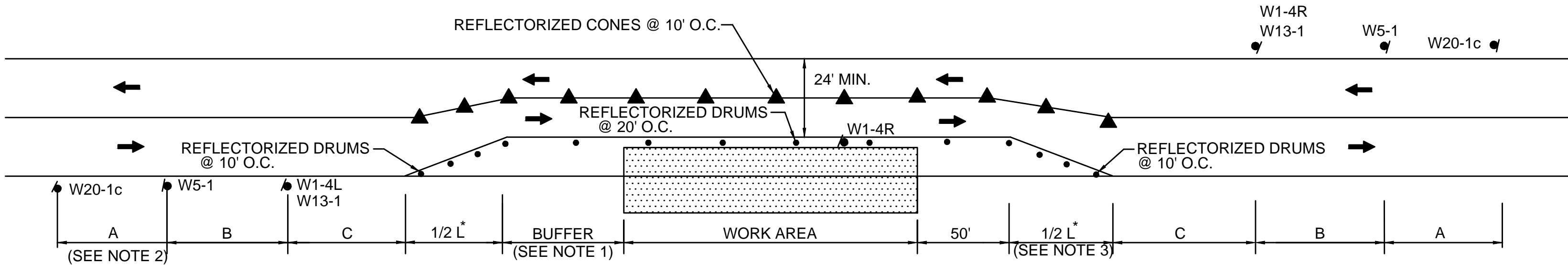
ADVANCE SIGN SCHEMATIC
NTS
SIGNS TO BE INSTALLED AT THE PROJECT
LIMITS AS SHOWN.
ALL ADVANCE SIGNS TO BE IN PLACE FOR
THE DURATION OF THE PROJECT.
THE CONTRACTOR SHALL COVER ANY ADVANCE SIGNAGE IF THE SIGNAGE
FROM A DAILY OPERATIONAL SETUP INTERFERES WITH THE ADVANCE SIGNING.

WESTFORD RT 110 & TADMUCK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	31	40
PROJECT FILE NO. 607251			

TEMPORARY TRAFFIC CONTROL PLANS

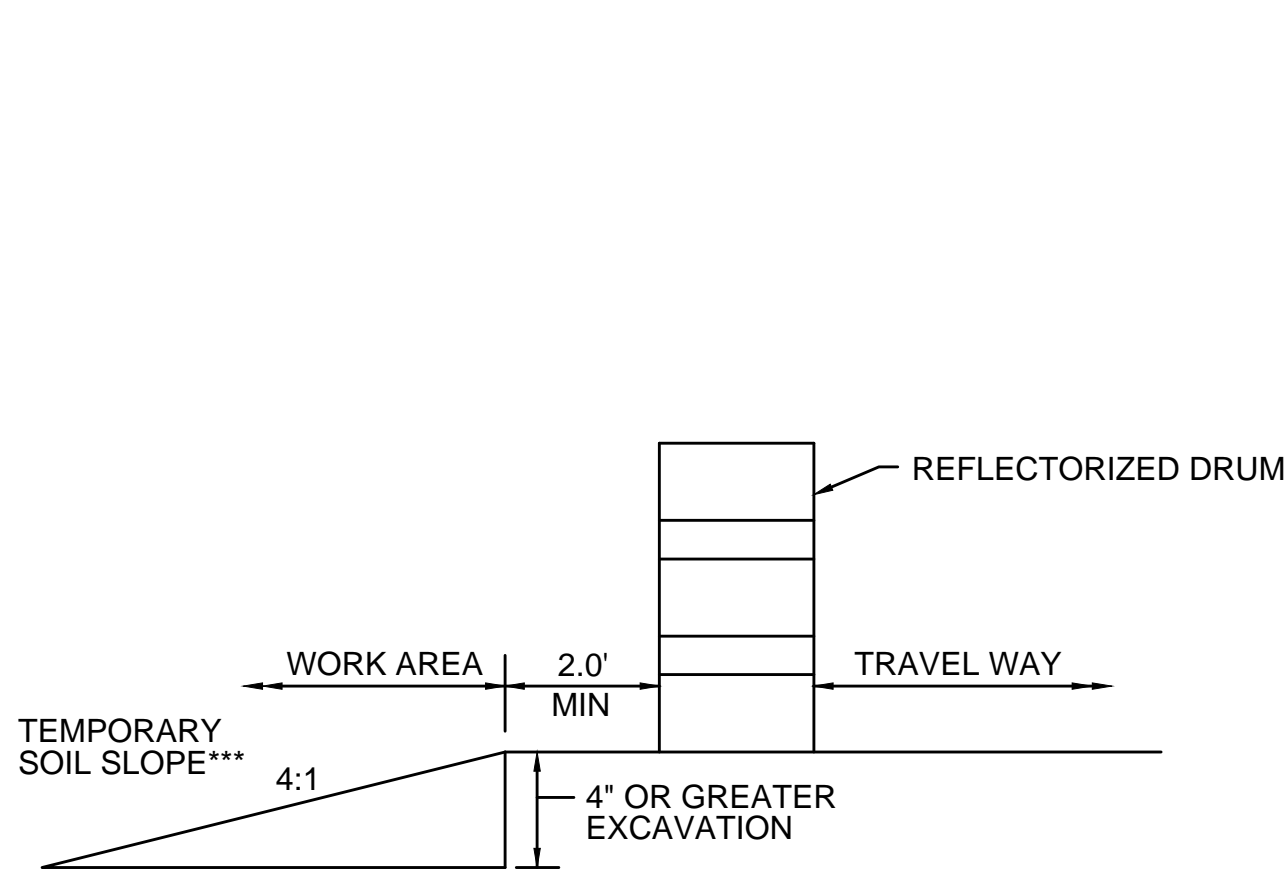


- NOTES:
- SEE BUFFER SPACING CHART
 - REFER TO ADVANCE SIGN SPACING TABLE
 - REFER TO NOTE 17 ON SHEET 29



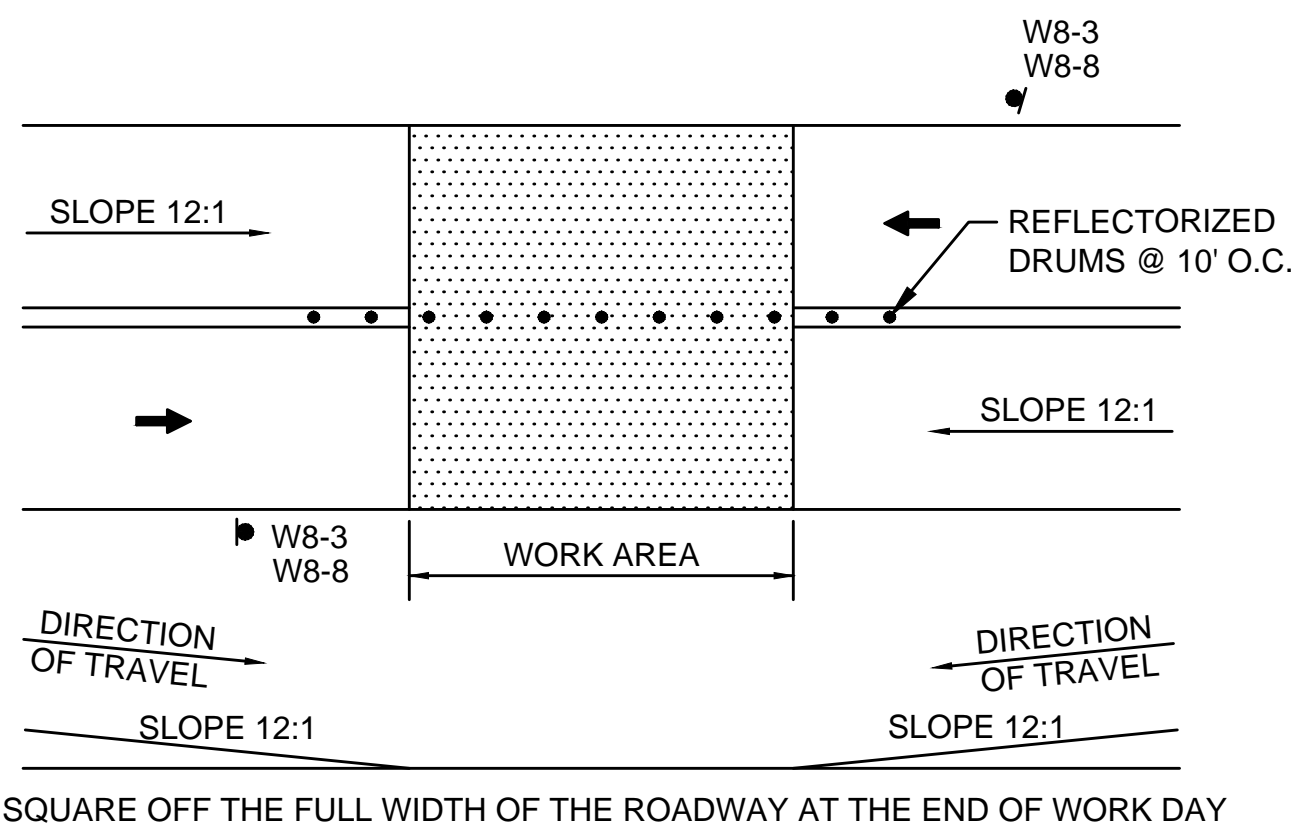
- NOTES:
- SEE BUFFER SPACING CHART
 - REFER TO ADVANCE SIGN SPACING TABLE
 - SEE TAPER LENGTH FORMULA

NOTE: THE ABOVE DETAILS SHOW A RIGHT LANE CLOSURE/SHIFT. THESE DETAILS CAN ALSO BE USED FOR LEFT LANE CLOSURES/SHIFTS, WITH THE SIGN AND DEVICE PLACEMENT REVERSED AS APPROPRIATE.



ROADWAY SLOPE PROTECTION

*** SEE NOTE 9 ON SHEET 29



TEMPORARY PAVEMENT TRANSITION DETAIL

NOT TO SCALE

BUFFER SPACING

SPEED (MPH)	DISTANCE (FEET)
25	155
30	200
35	250
40	305
45	360
50	425

ADVANCE SIGN SPACING

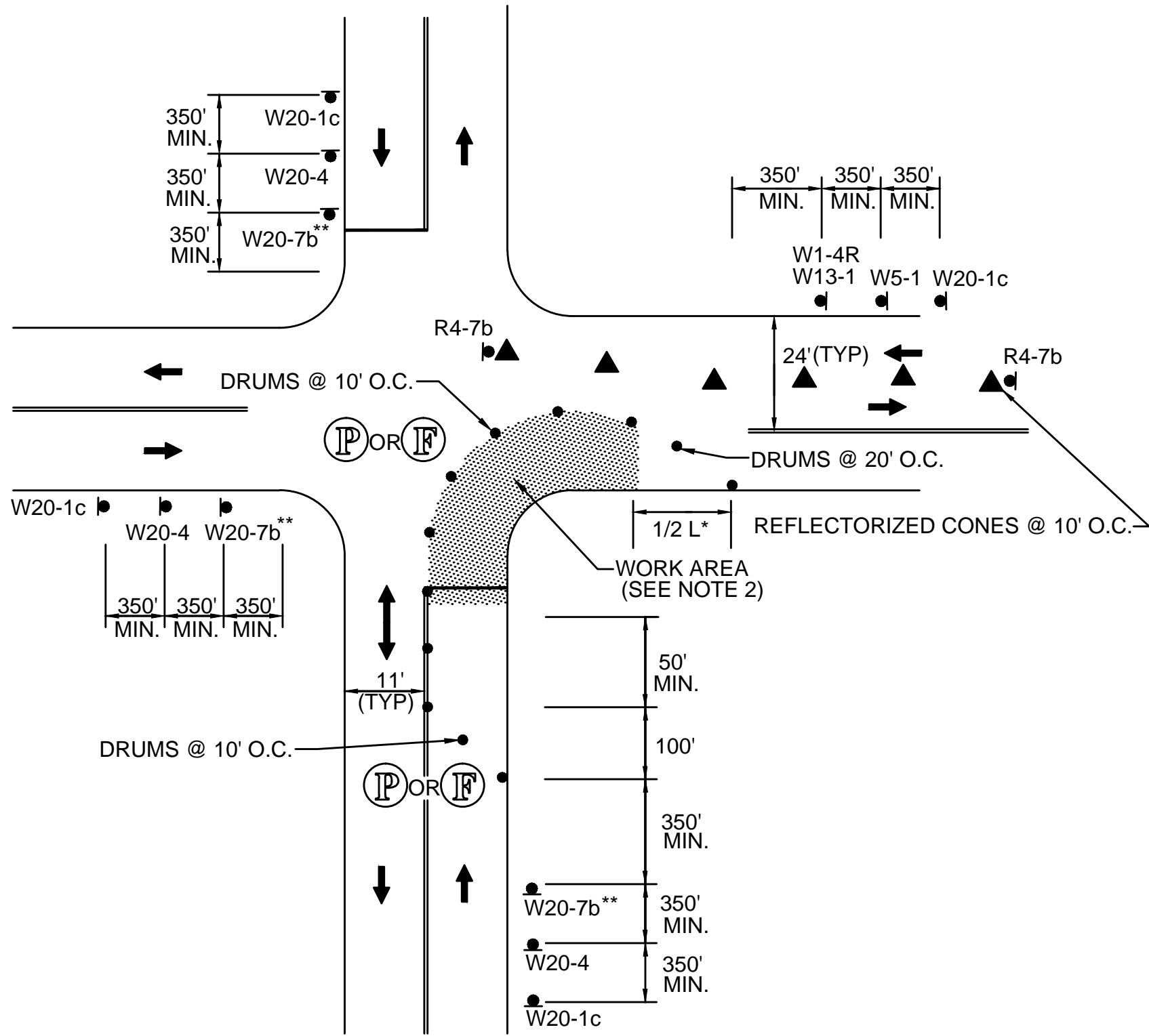
	LOCATION	DISTANCE [FT]
A	ROUTE 110	500
	TADMUCK RD	350
B	ROUTE 110	500
	TADMUCK RD	350
C	ROUTE 110	500
	TADMUCK RD	350

FOR POSTED SPEEDS GREATER THAN 40 MPH

L=TAPER LENGTH
*L = W x S W=WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED
S=POSTED SPEED LIMIT

FOR POSTED SPEEDS OF 40 MPH OR LESS

*L= $\frac{WS^2}{60}$ L=TAPER LENGTH
W=WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED
S=POSTED SPEED LIMIT



ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS

NOT TO SCALE

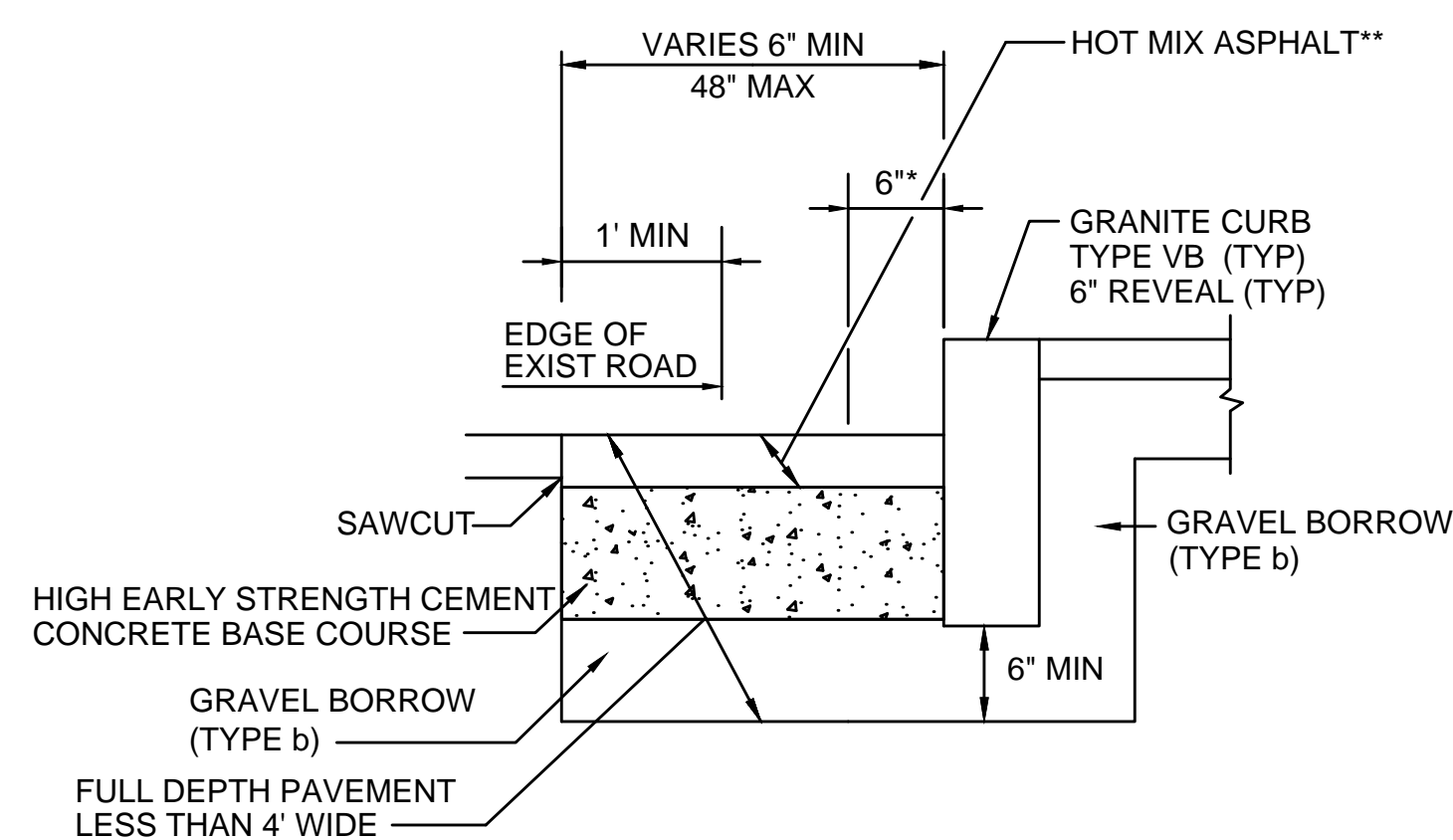
- NOTES:
- ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY BY THE ENGINEER.
 - ANY EXCAVATION GREATER THAN 3' DEEP ADJACENT TO TRAFFIC SHALL BE PROTECTED BY TEMPORARY CONCRETE BARRIER.
 - ** SEE NOTE 17 ON SHEET 29.

LEGEND

- REFLECTORIZED DRUM
- REFLECTORIZED CONE
- POLICE OFFICER/FLAGGER
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY CONCRETE BARRIER
- TYPE III BARRICADES
- WORK ZONE
- PROPOSED TRAFFIC FLOW
- ARROWBOARD [AB] (MODE)
- NTS NOT TO SCALE

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	32	40

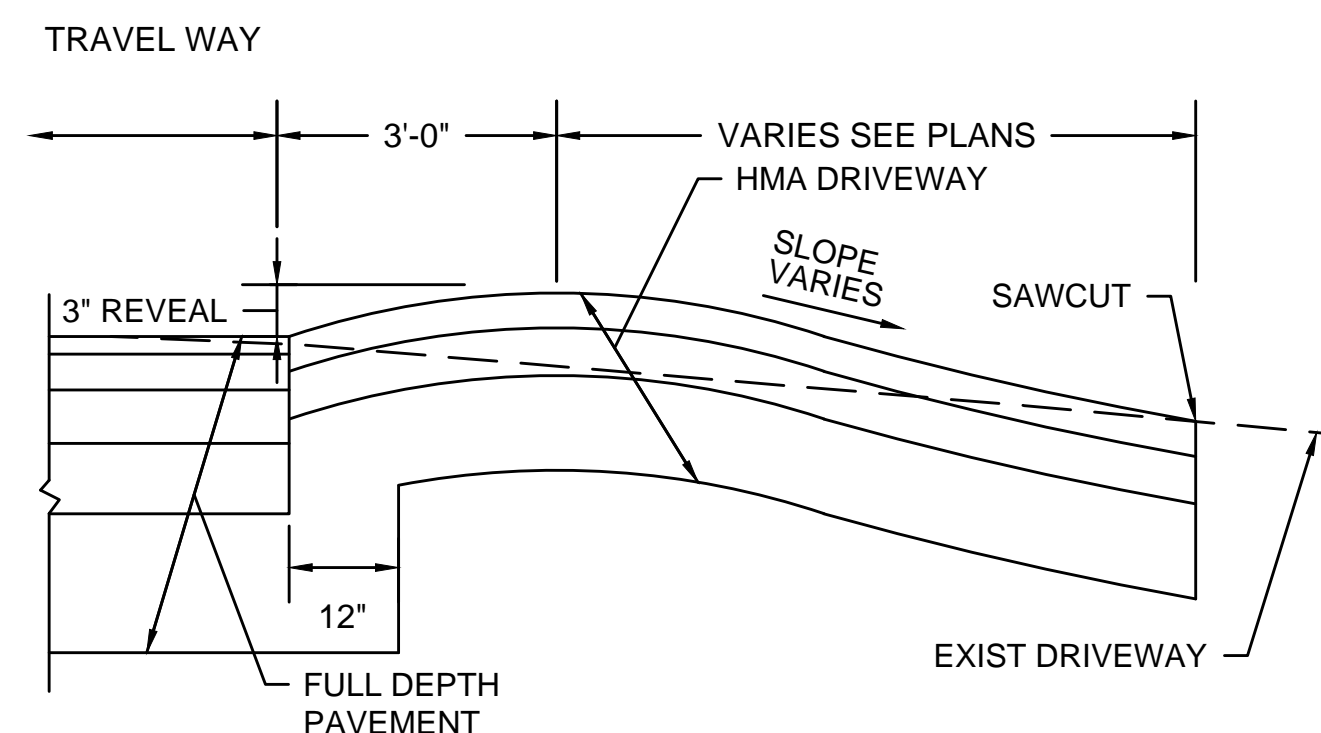
CONSTRUCTION DETAILS



* 6" OF HIGH EARLY STRENGTH CEMENT
CONCRETE BASE COURSE SHALL BE INCLUDED
IN PRICE BID FOR GRANITE CURB.
** SEE PAVEMENT NOTES, SHEET 5

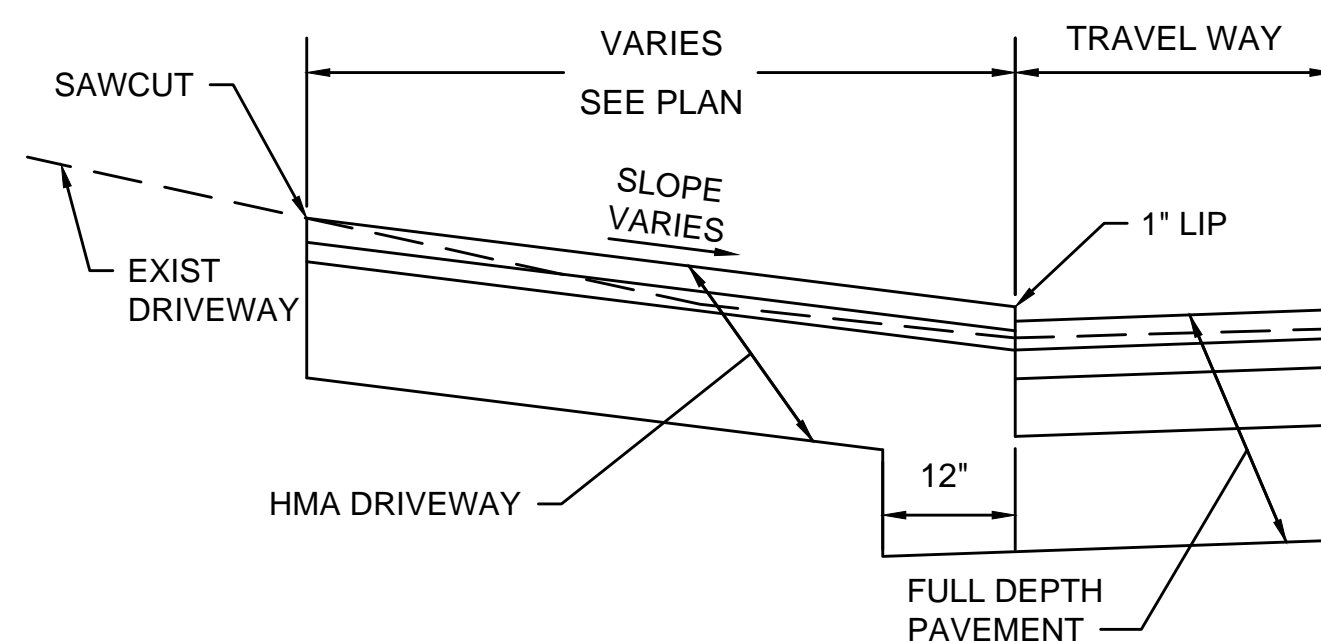
GRANITE CURB IN FULL DEPTH PAVEMENT LESS THAN 4' WIDE

SCALE: N.T.S. DWG: CURB-06 DATE: APRIL 2003



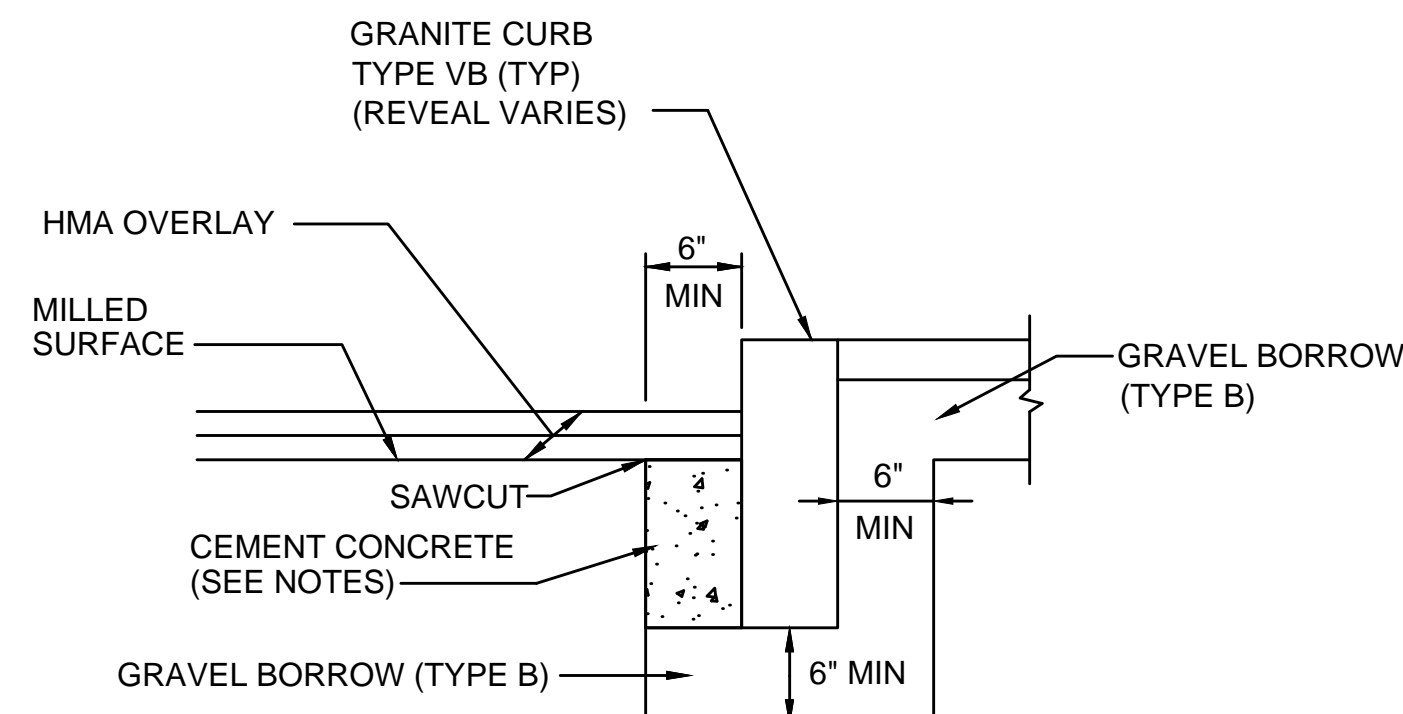
TYPICAL DRIVEWAY SECTION WITHOUT SIDEWALK TYPE I

SCALE: N.T.S. DWG: DRIVE-02 DATE: MAY 2013



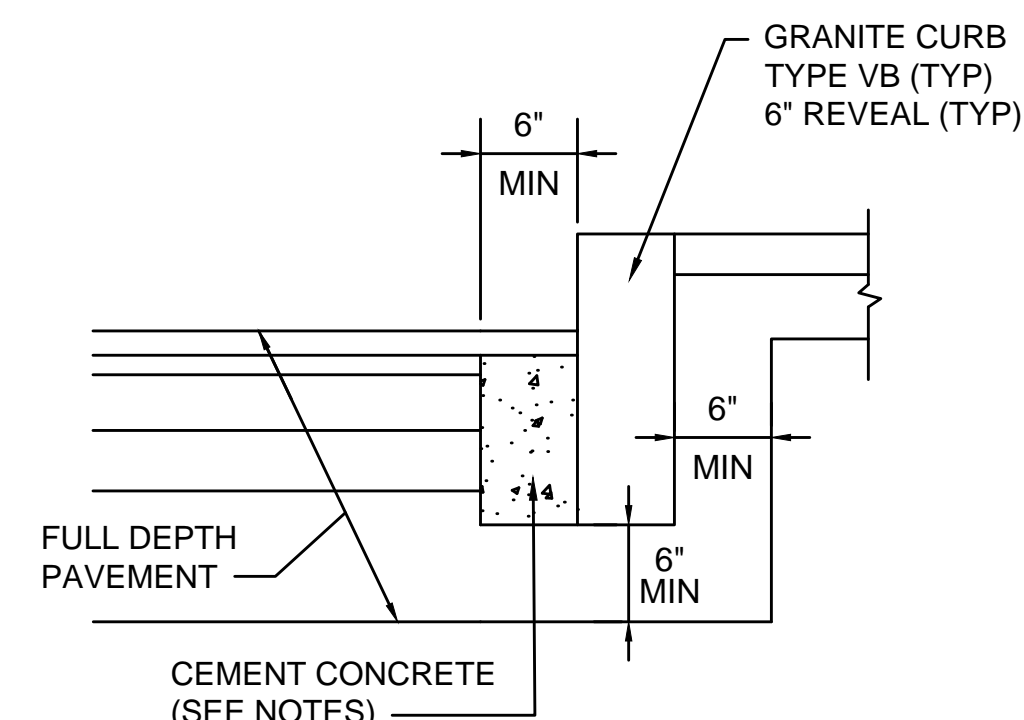
TYPICAL DRIVEWAY SECTION WITHOUT SIDEWALK TYPE II

SCALE: N.T.S. DWG: DRIVE-03 DATE: JUNE 2013



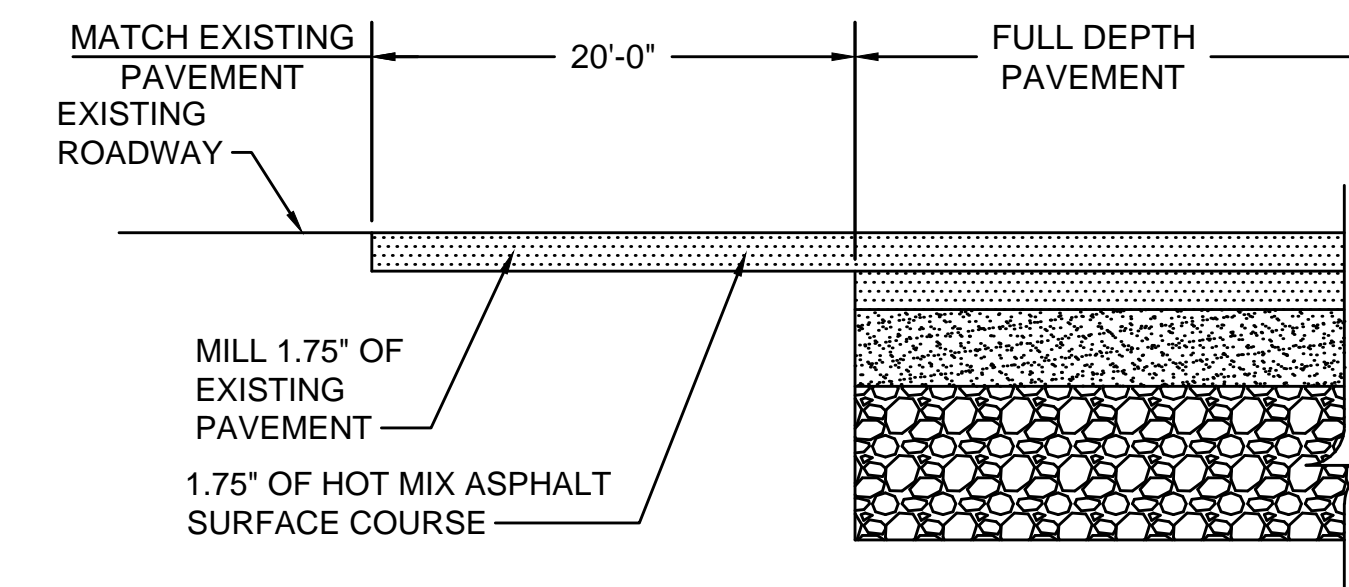
NOTES:

1. CONCRETE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.
2. SAWCUT 6" FROM CURB LINE AND REMOVE EXISTING PAVEMENT AND GRAVEL. REPLACE WITH CEMENT CONCRETE.
3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED. ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.



NOTES:

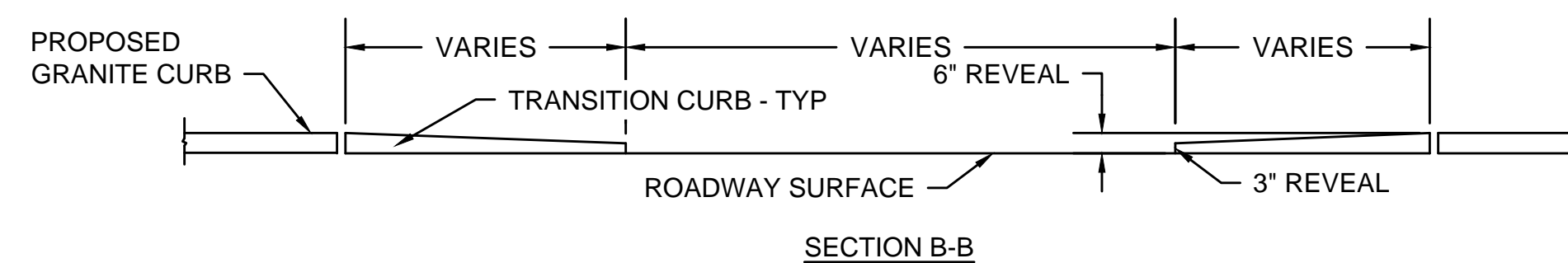
1. TO BE PLACED IF CURB IS INSTALLED AFTER HOT MIX ASPHALT
2. CONCRETE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB
3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED. ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.



LONGITUDINAL SECTION

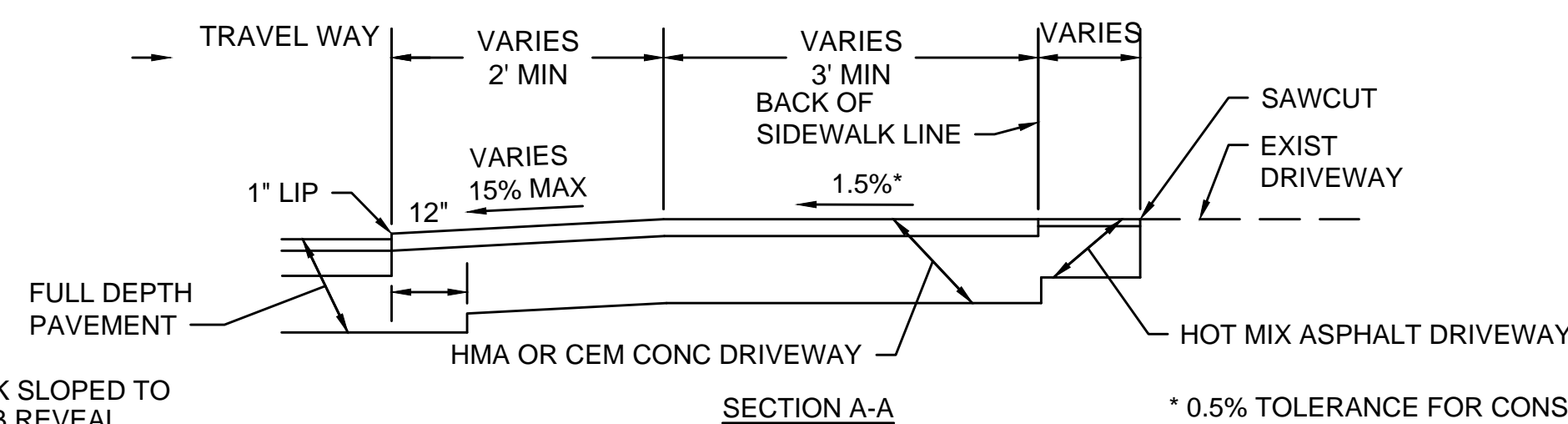
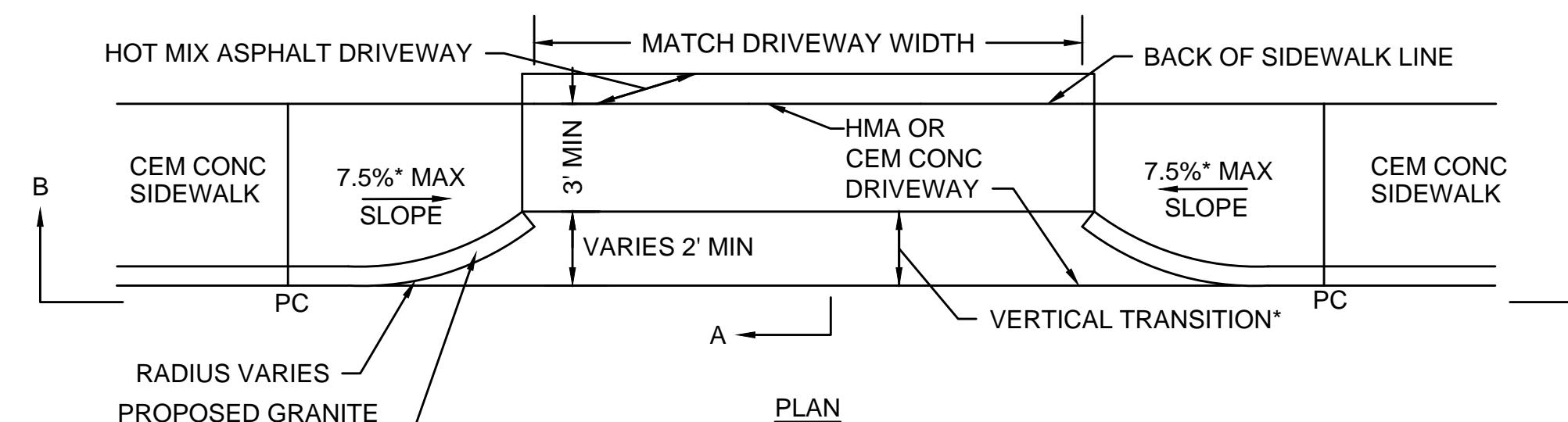
GRANITE CURB IN PAVEMENT MILLING AND OVERLAY

SCALE: N.T.S. DWG: CURB-04 DATE: APRIL 2003



GRANITE CURB IN FULL DEPTH PAVEMENT

SCALE: N.T.S. DWG: CURB-05 DATE: MARCH 2013



* DRIVEWAY AND SIDEWALK SLOPED TO MEET AT 1/2 OF THE CURB REVEAL

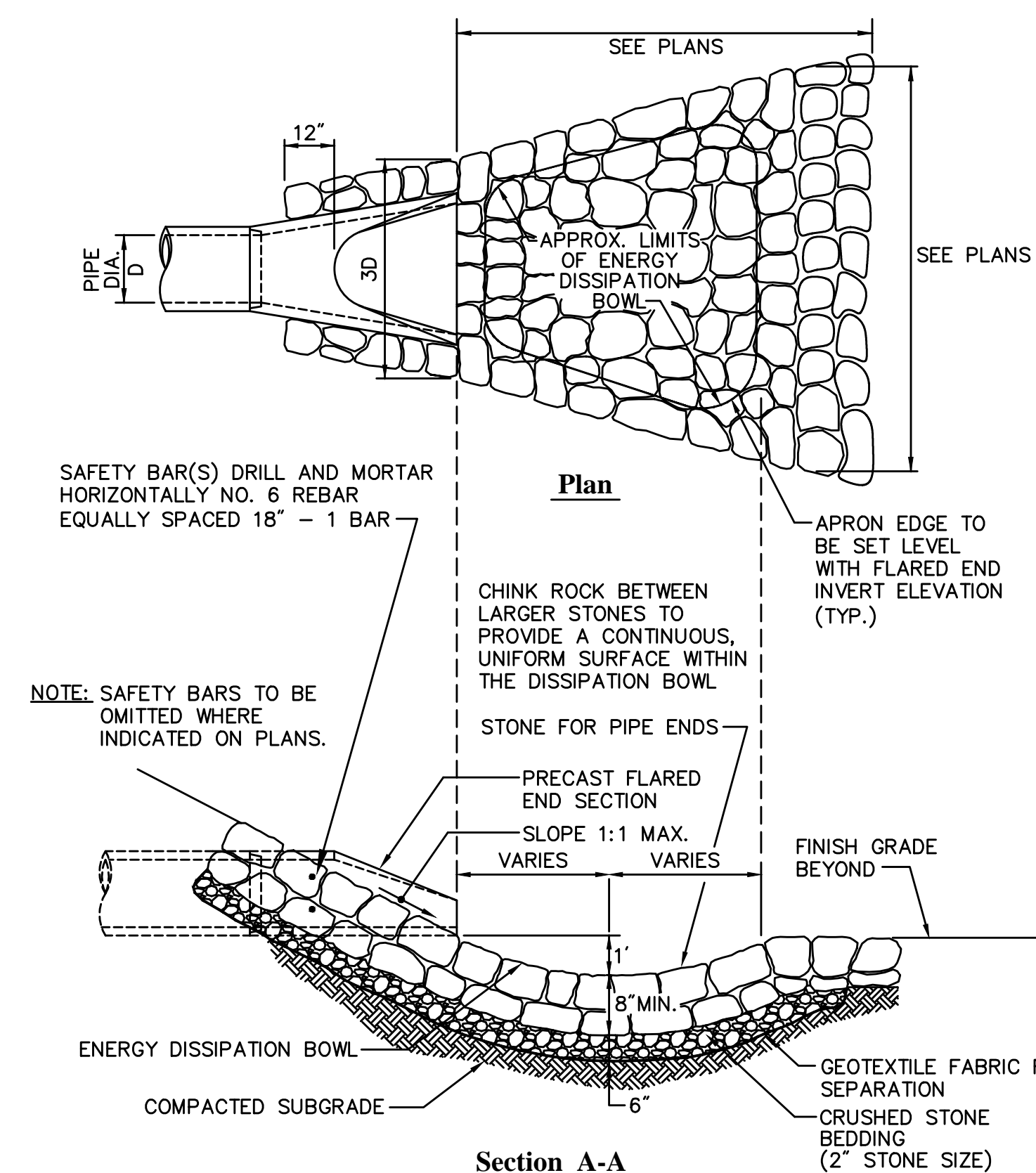
* 0.5% TOLERANCE FOR CONSTRUCTION

TYPICAL DRIVEWAY WITH SIDEWALK AND CURVED TRANSITION CURB

SCALE: N.T.S. DWG: DRIVE-09 DATE: JUNE 2013

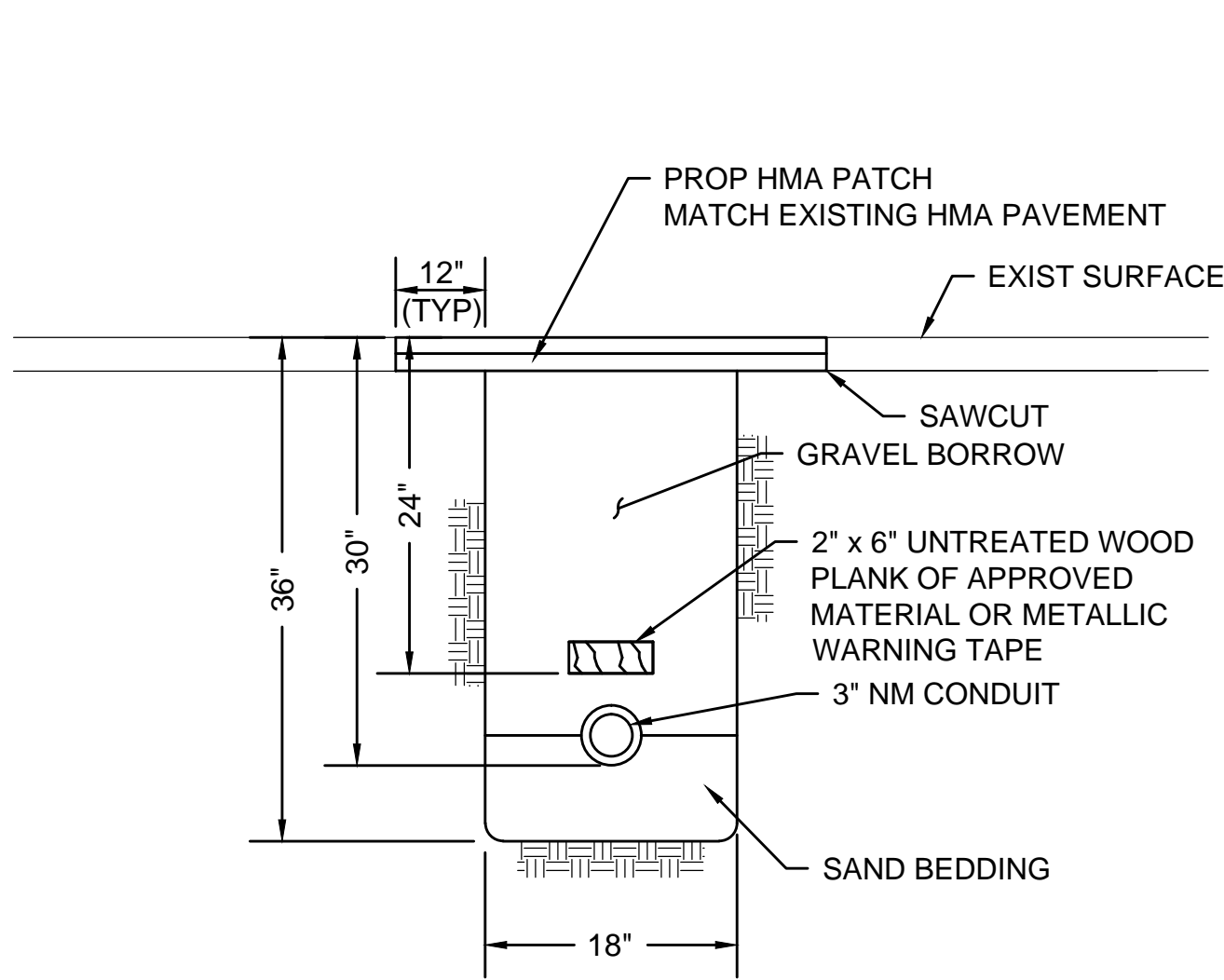
FULL DEPTH PAVEMENT TRANSITION

SCALE: N.T.S. DWG: PVMT-03 DATE: OCT. 2012



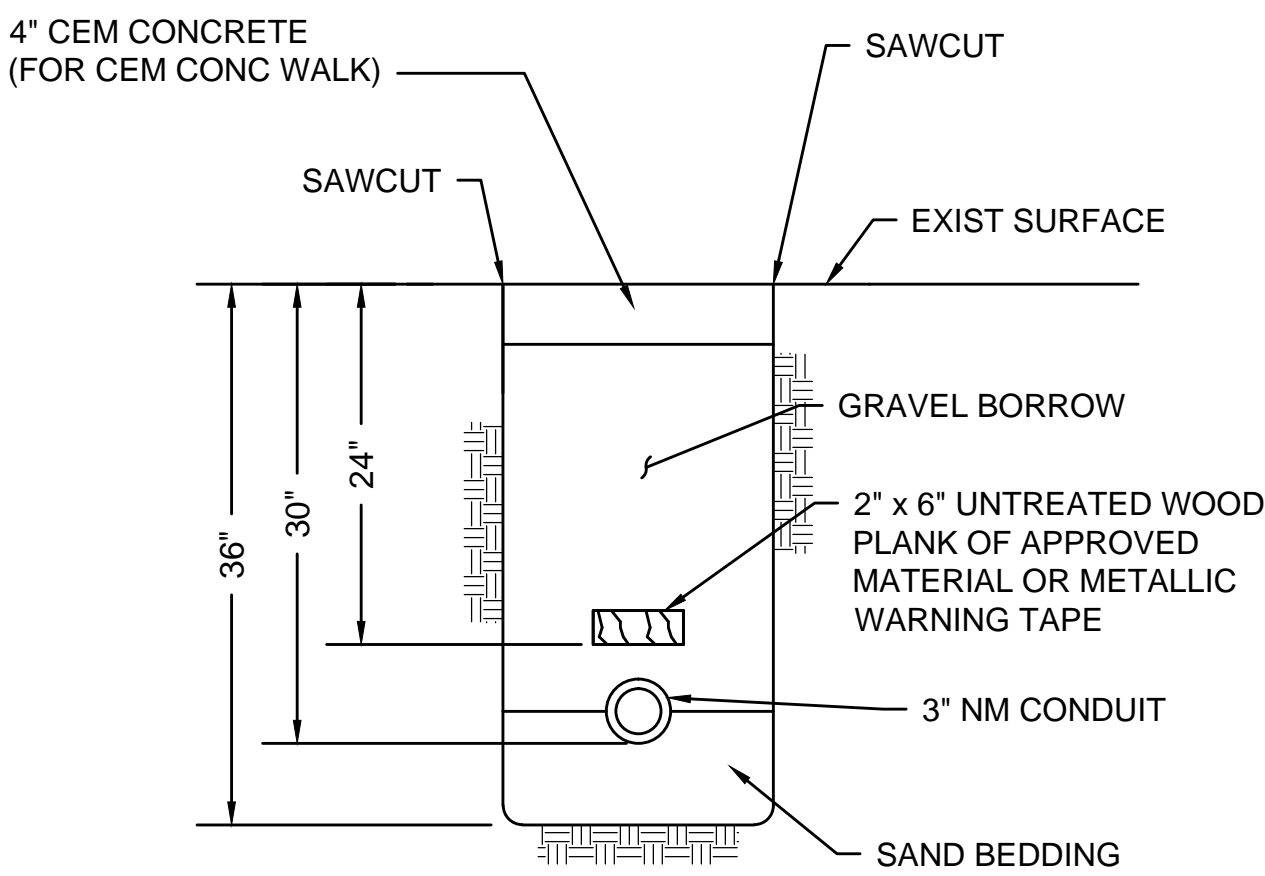
FLARED END SECTION (FES)

SCALE: N.T.S. DWG: DRAIN-05 DATE: MARCH 2013



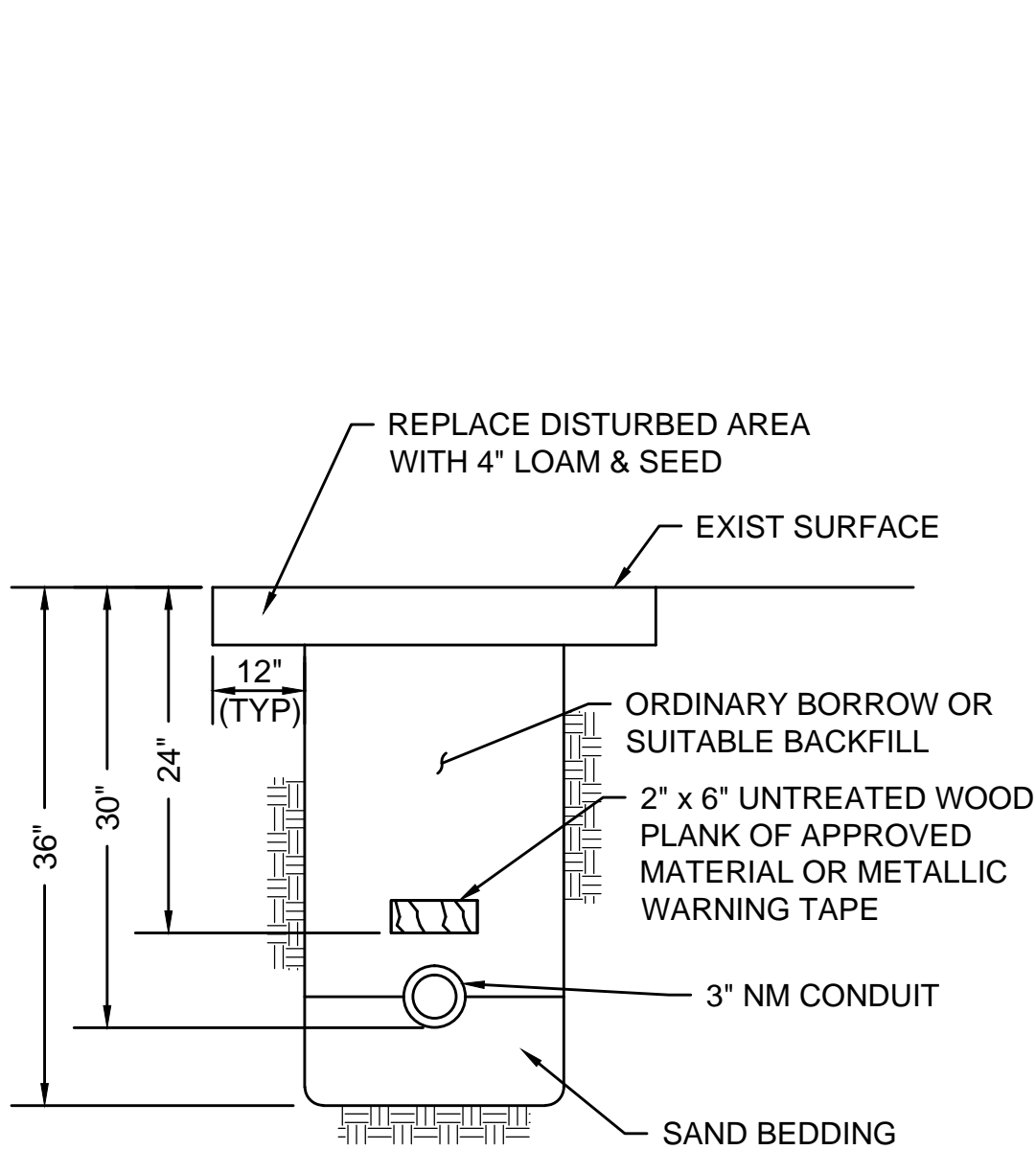
CONDUIT CROSSING
ROADWAY/DRIVEWAY

SCALE: N.T.S. DWG: TRENCH-01 DATE: MARCH 2013



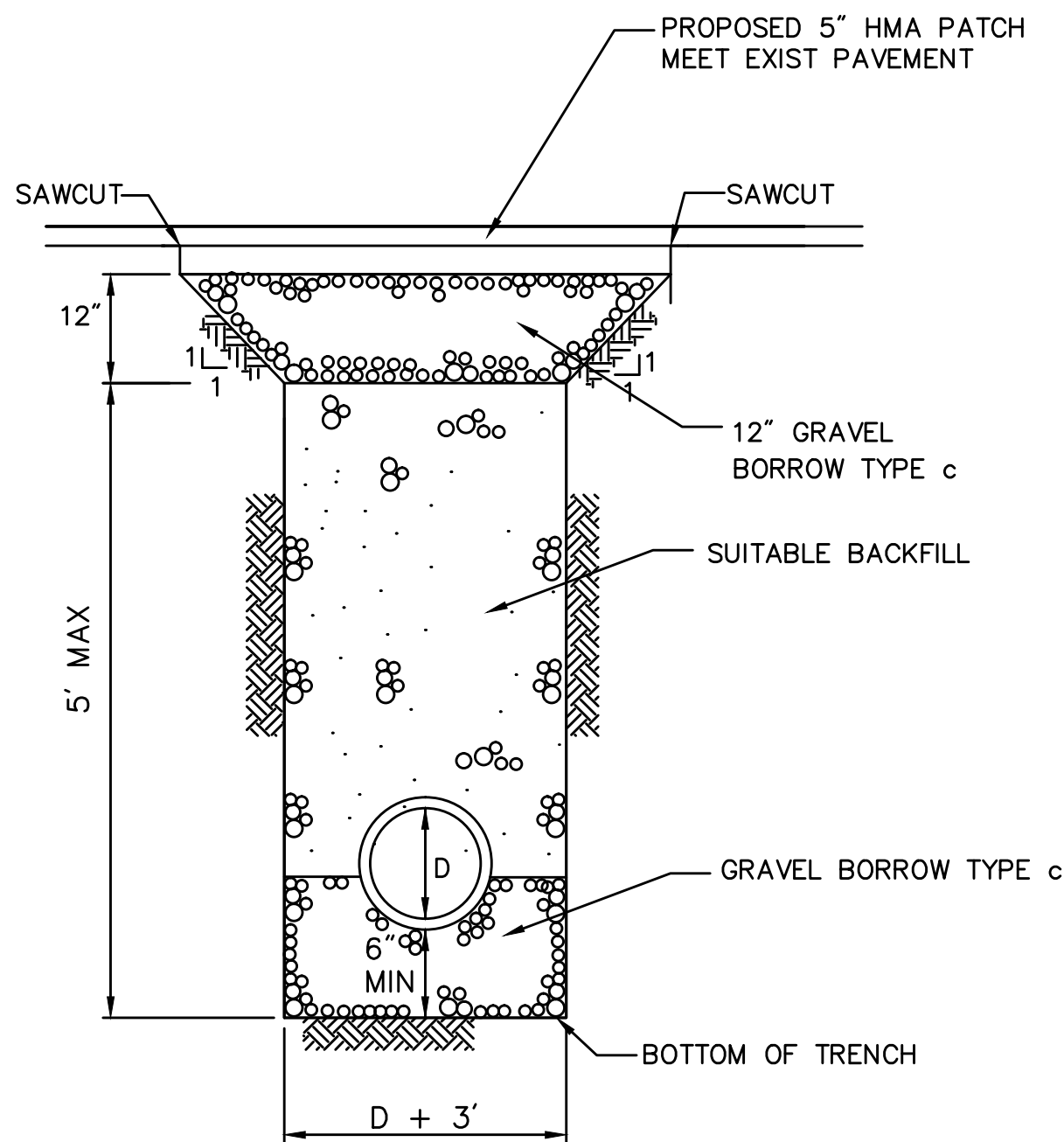
CONDUIT IN SIDEWALK

SCALE: N.T.S. DWG: TRENCH-03 DATE: MARCH 2013



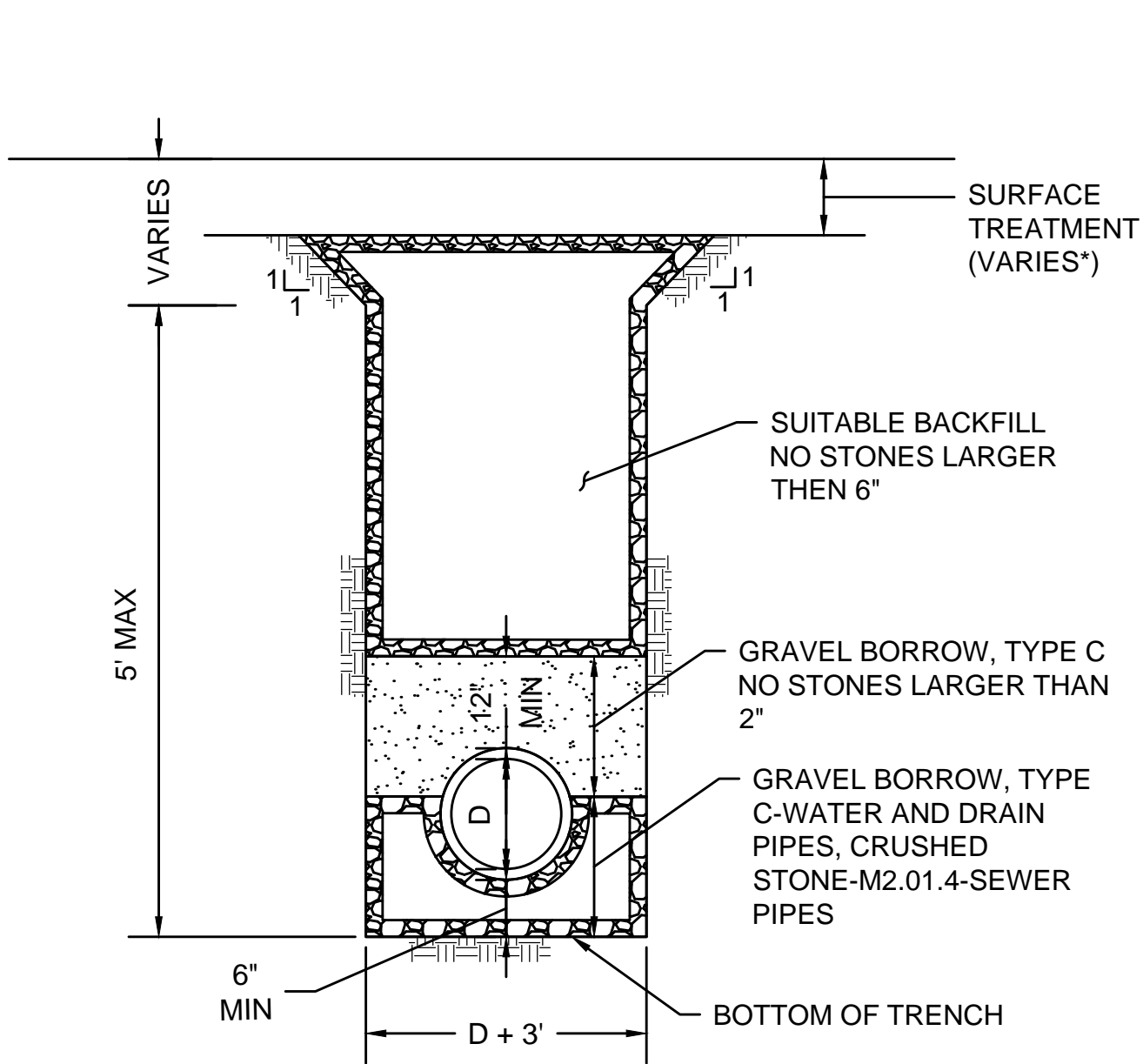
CONDUIT IN GRASS

SCALE: N.T.S. DWG: TRENCH-02 DATE: MARCH 2013



TRENCH IN MICROMILL & PAVEMENT OVERLAY

SCALE: N.T.S. DWG: TRENCH-01

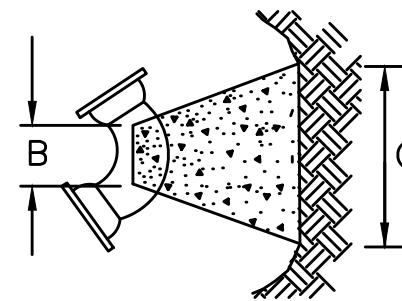


* SEE PAVEMENT NOTES, SHEET 5

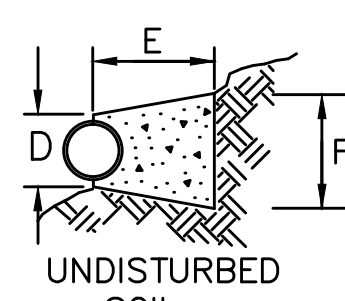
TRENCH DETAIL

SCALE: N.T.S. DWG: TRENCH-05 DATE: MARCH 2013

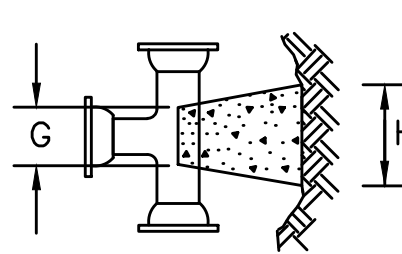
BENDS						BENDS					
6"	11-1/4"	8"	15"	12"	24"	6"	45"	8"	30"	12"	24"
6"	22-1/2"	"	19"	"	"	6"	90"	"	30"	"	27"
8"	11-1/4"	"	20"	"	"	8"	45"	"	30"	"	24"
8"	22-1/2"	"	22"	"	"	8"	90"	"	30"	"	36"
12"	11-1/4"	"	30"	"	"	12"	45"	"	40"	"	40"
12"	22-1/2"	"	35"	"	"	12"	90"	"	60"	"	52"
TEES						TEES					
6" x 6" x 6"	12"	24"	24"	18"		12" x 12" x 6"	12"	24"	24"	12"	
8" x 8" x 6"	"	"	"	"		12" x 12" x 8"	"	"	"	24"	
8" x 8" x 8"	"	"	"	24"		12" x 12" x 12"	"	36"	"	36"	



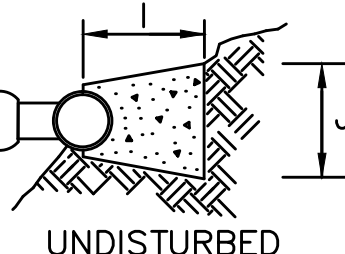
PLAN



SECTION



PLAN

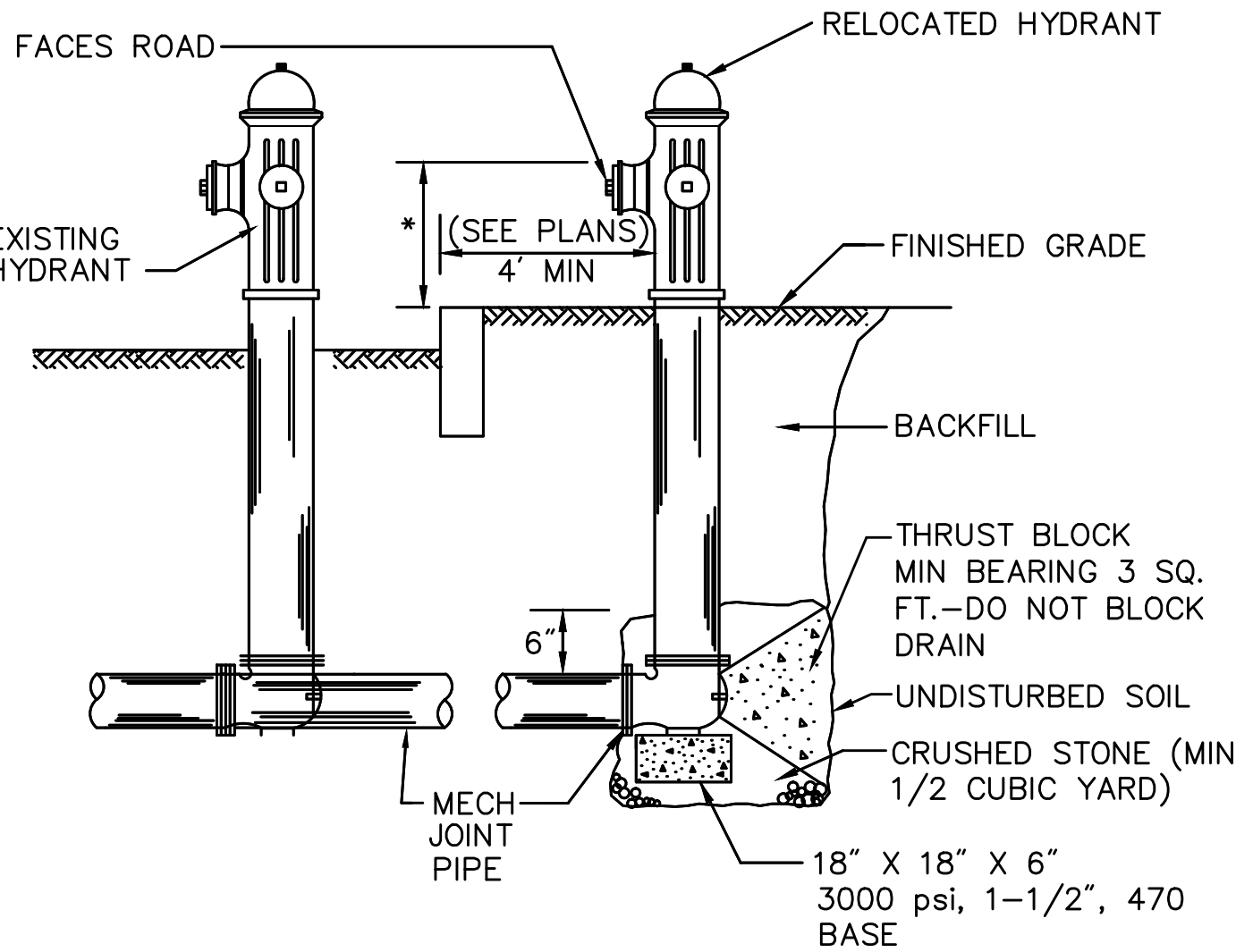


SECTION

- NOTES:
- PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE VALVES AND VERTICAL BENDS, SAME SIZE AS REQUIRED FOR TEES.
 - PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE VALVES
 - CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND FITTING.

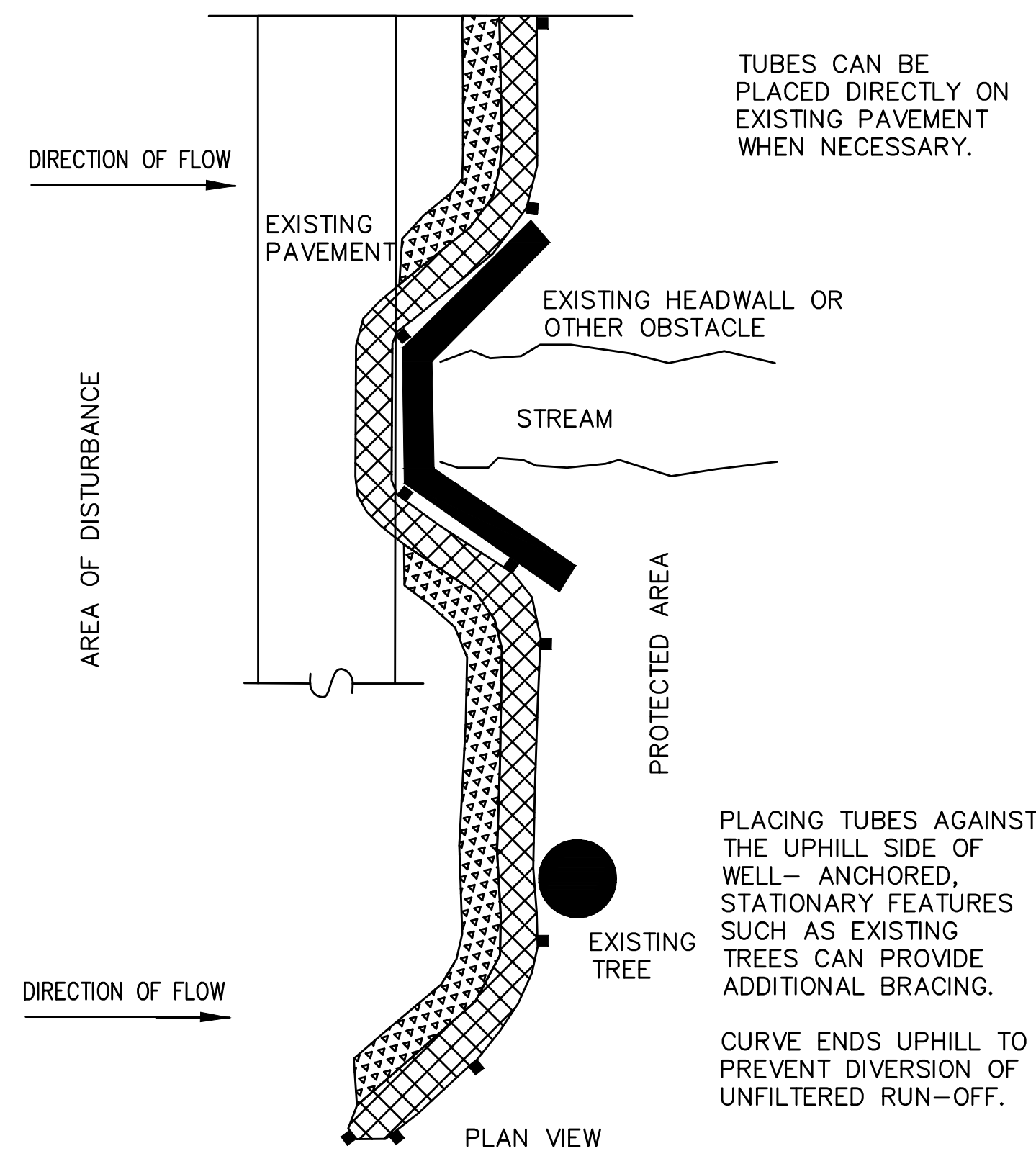
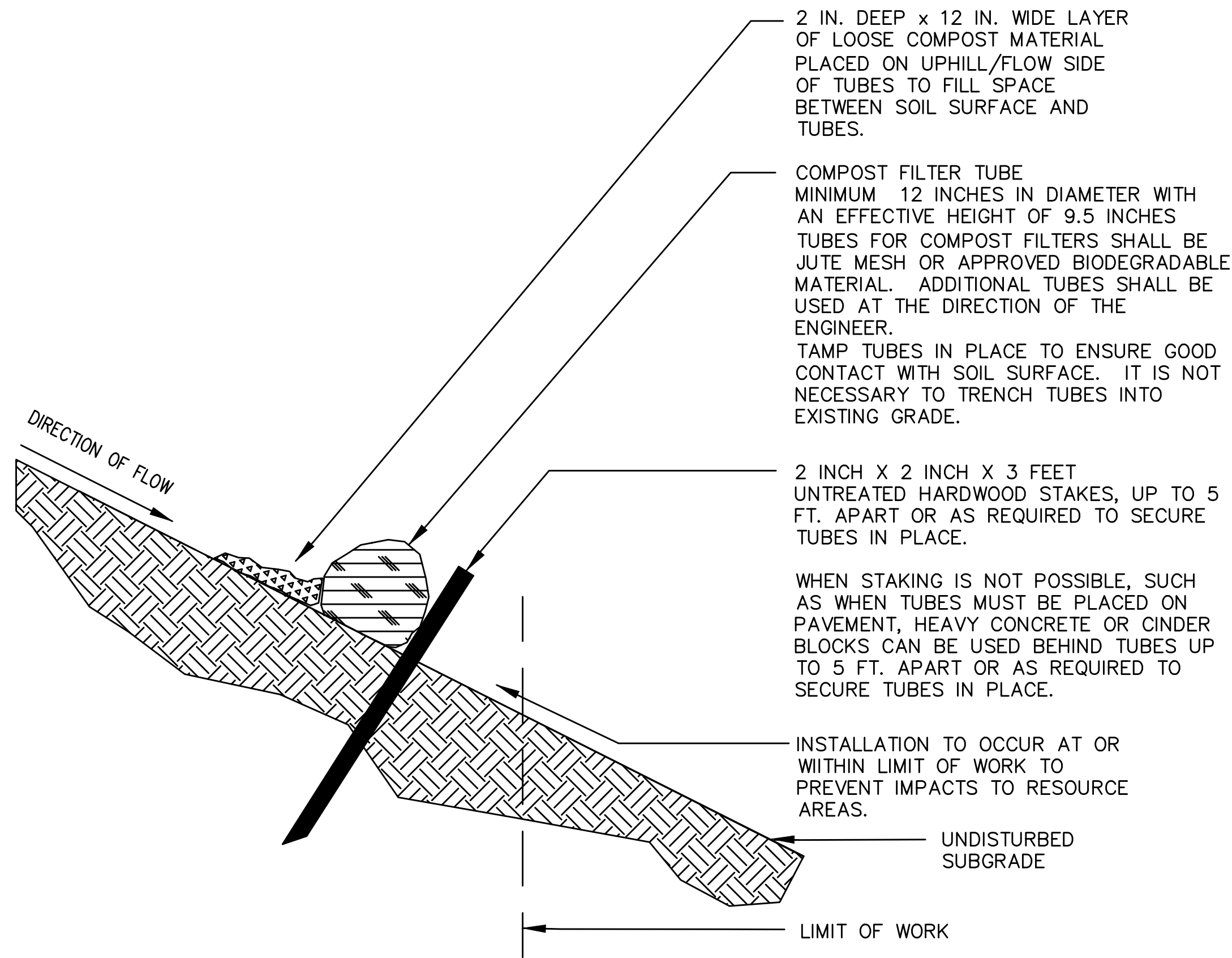
CONCRETE THRUST BLOCK

SCALE: N.T.S. DWG: WS-02 DATE: APRIL 2003

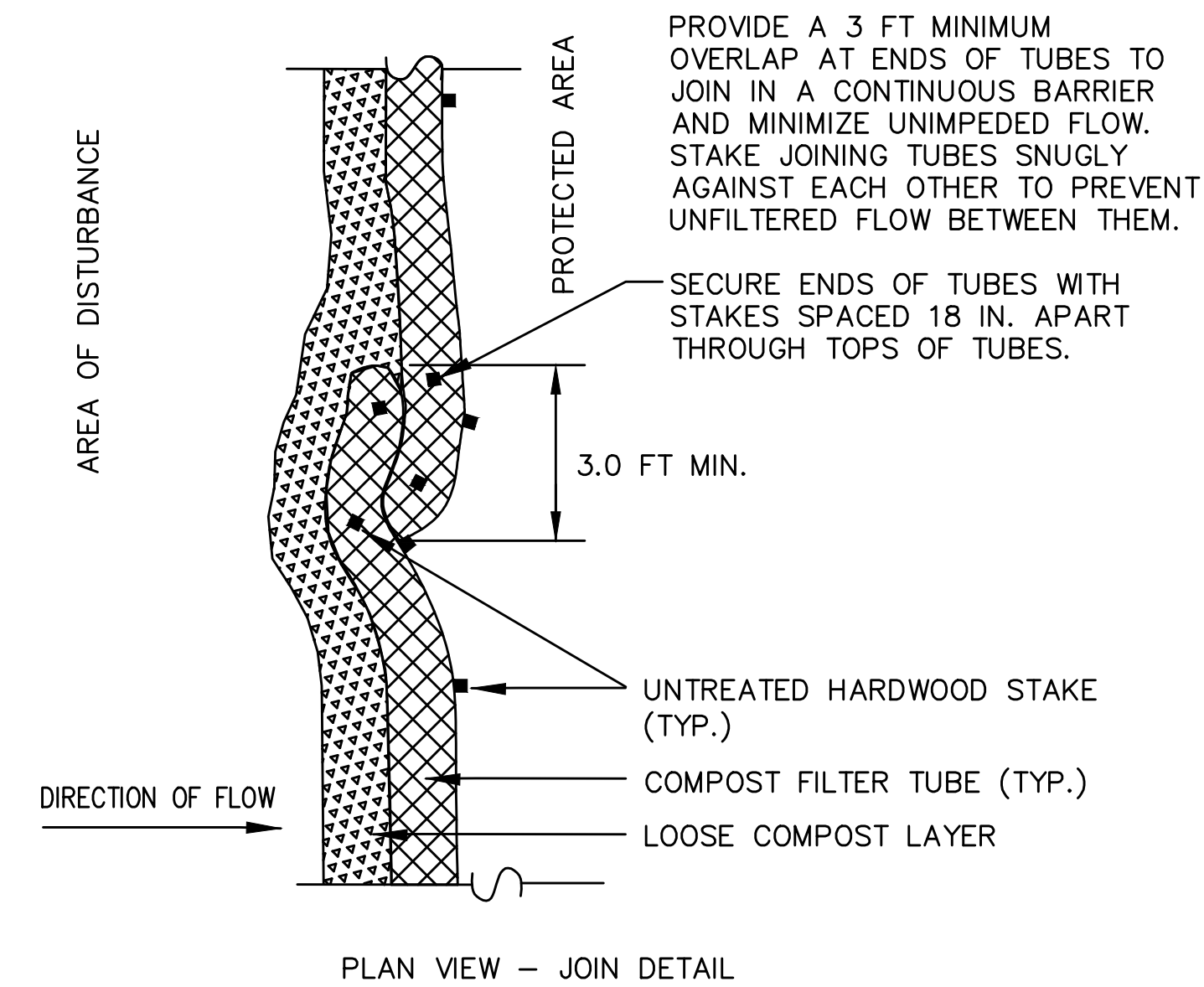


HYDRANT RELOCATION DETAIL

SCALE: N.T.S. DWG: WS-03 DATE: APRIL 2003



- GENERAL NOTES:
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSEING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
 2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
 3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
 4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.

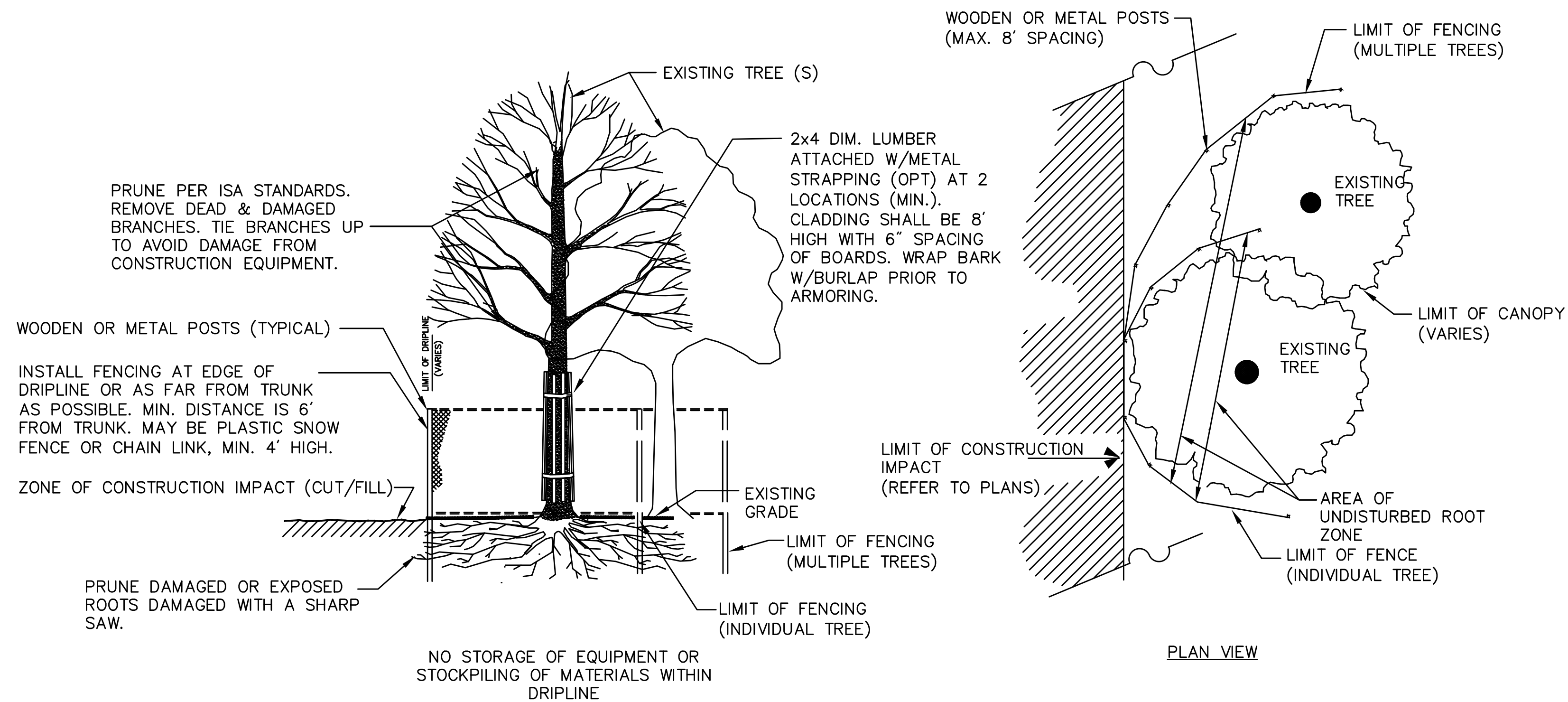


SINGLE COMPOST MULCH FILTER TUBE DETAIL

SCALE: N.T.S.

DWG: ----

DATE: ----



TREE PROTECTION

SCALE: N.T.S.

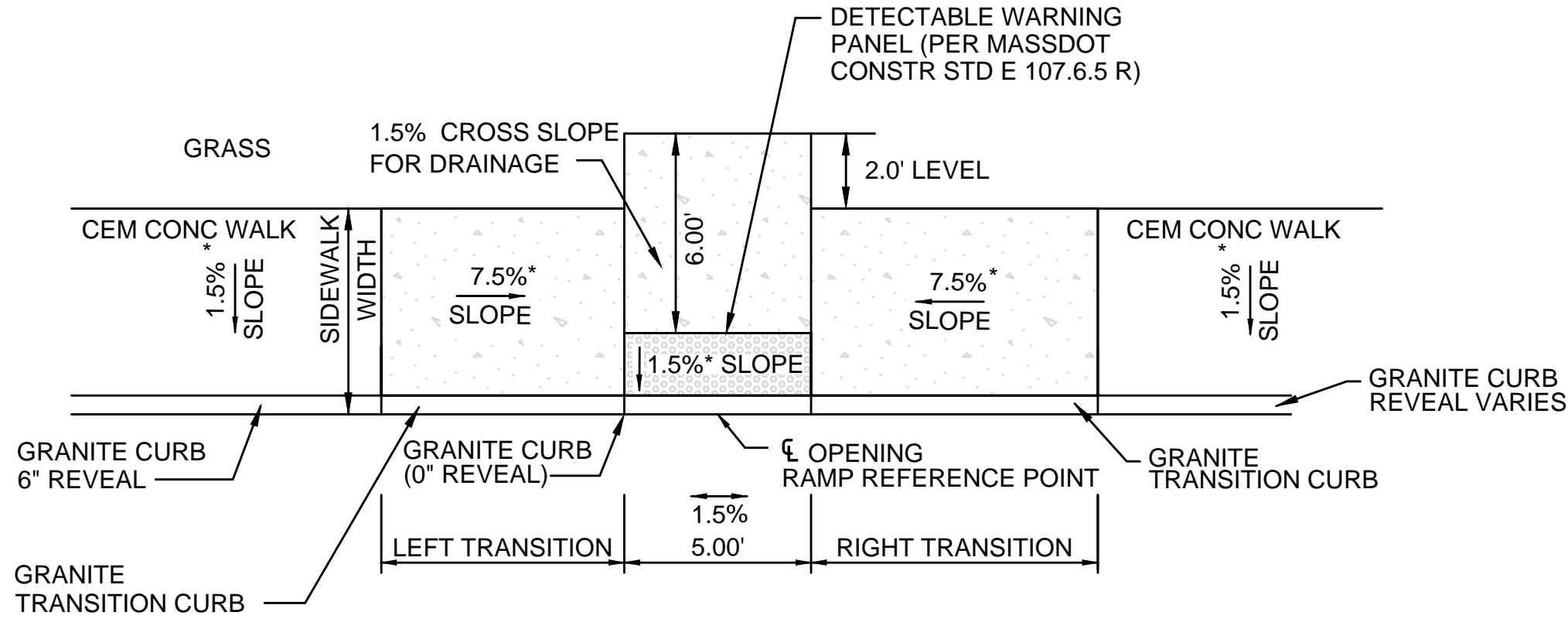
DWG: ----

DATE: ----

WESTFORD RT 110 & TADMUCK ROAD

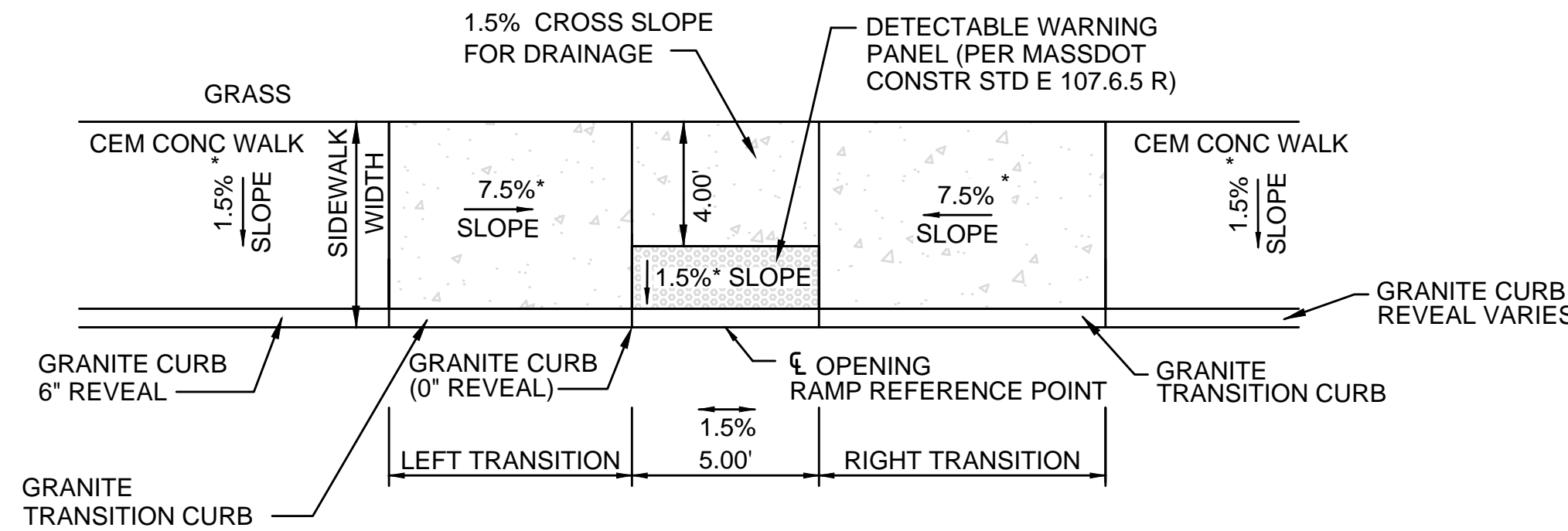
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	35	40
PROJECT FILE NO. 607251			

CONSTRUCTION DETAILS



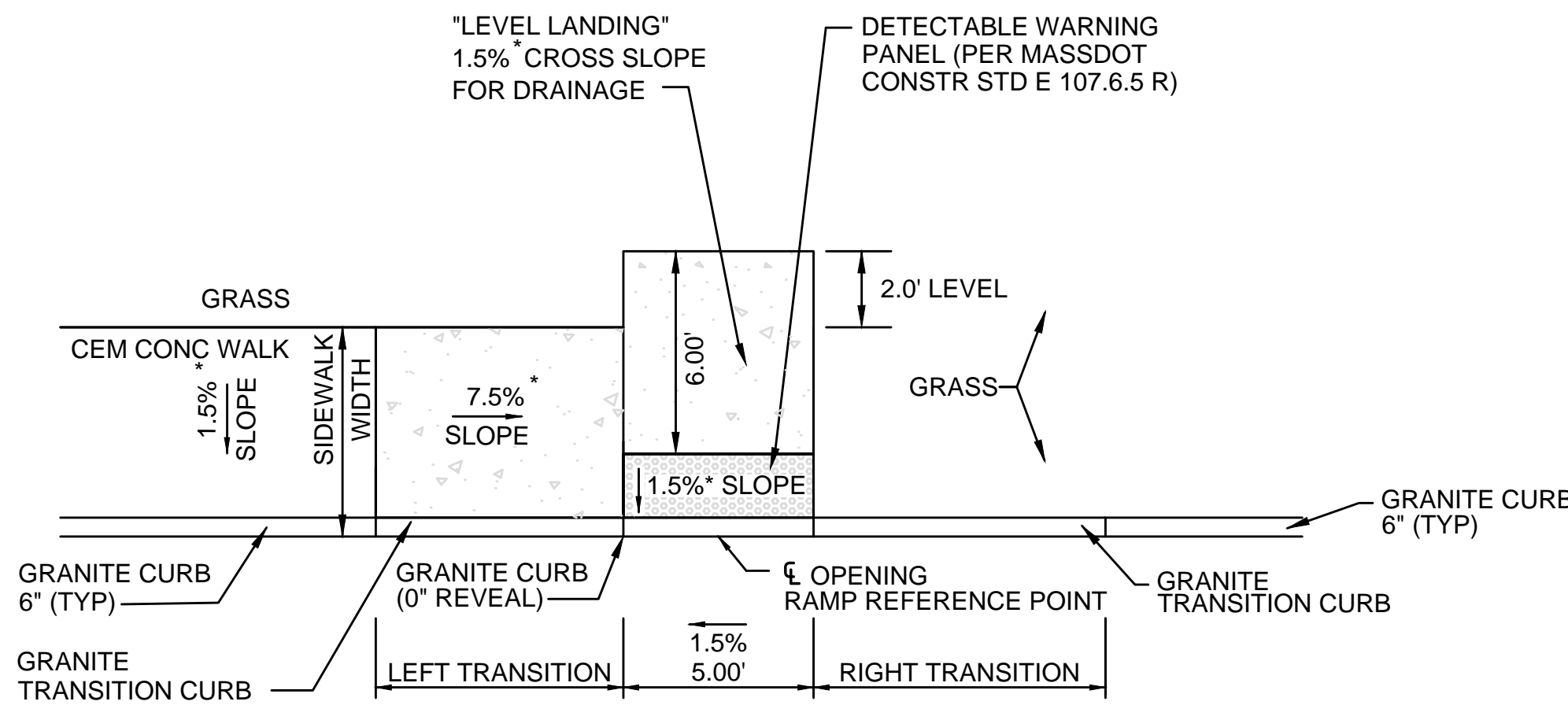
WHEEL CHAIR RAMP SIDEWALK -
LESS THAN 6.5' WITH 6' LEVEL AREA

SCALE: N.T.S. DWG: DATE:



WHEEL CHAIR RAMP -
SIDEWALK LESS THAN 6.5'

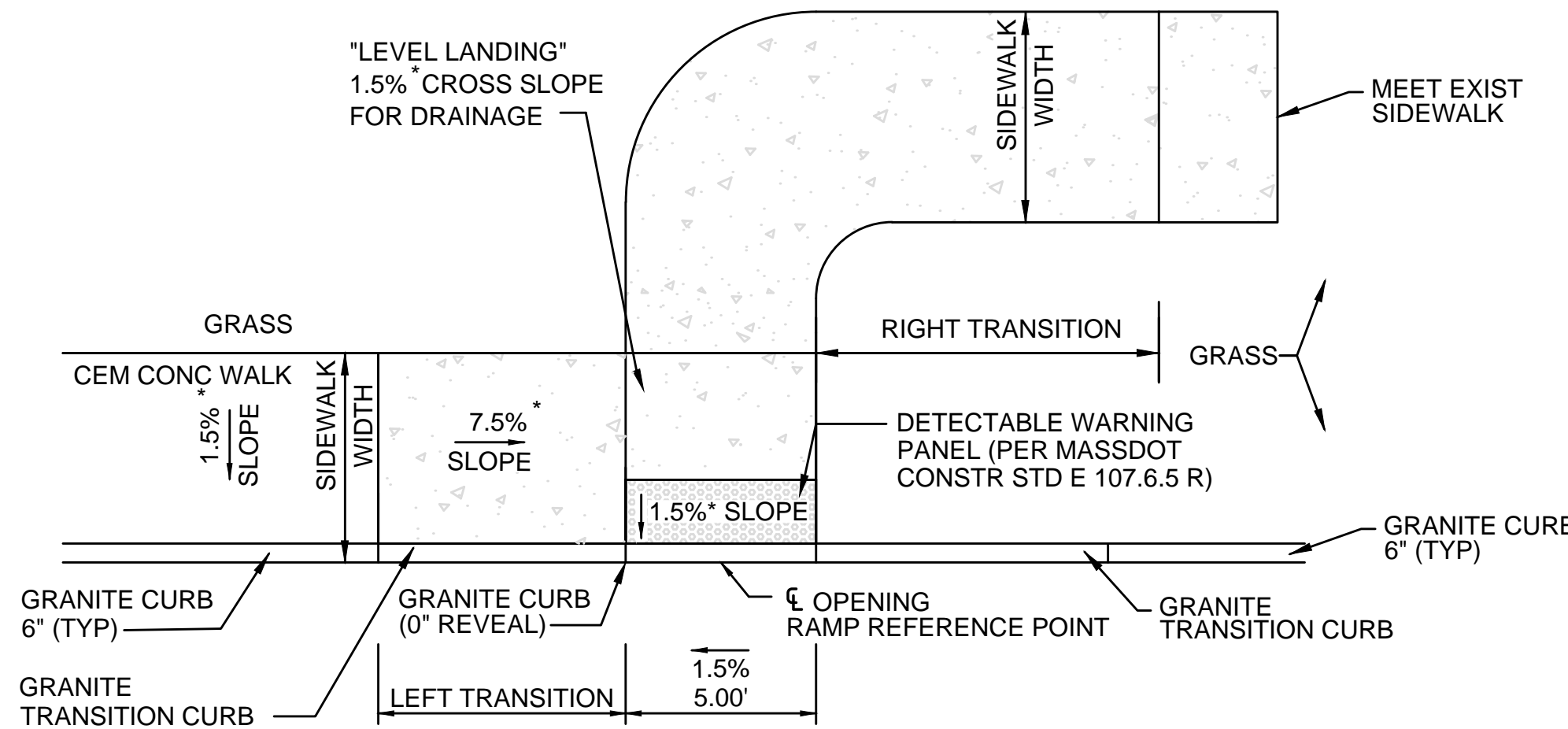
SCALE: N.T.S. DWG: DATE:



* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP - ONE WING
SIDEWALK LESS THAN 6.5 FT WITH 6' LEVEL AREA

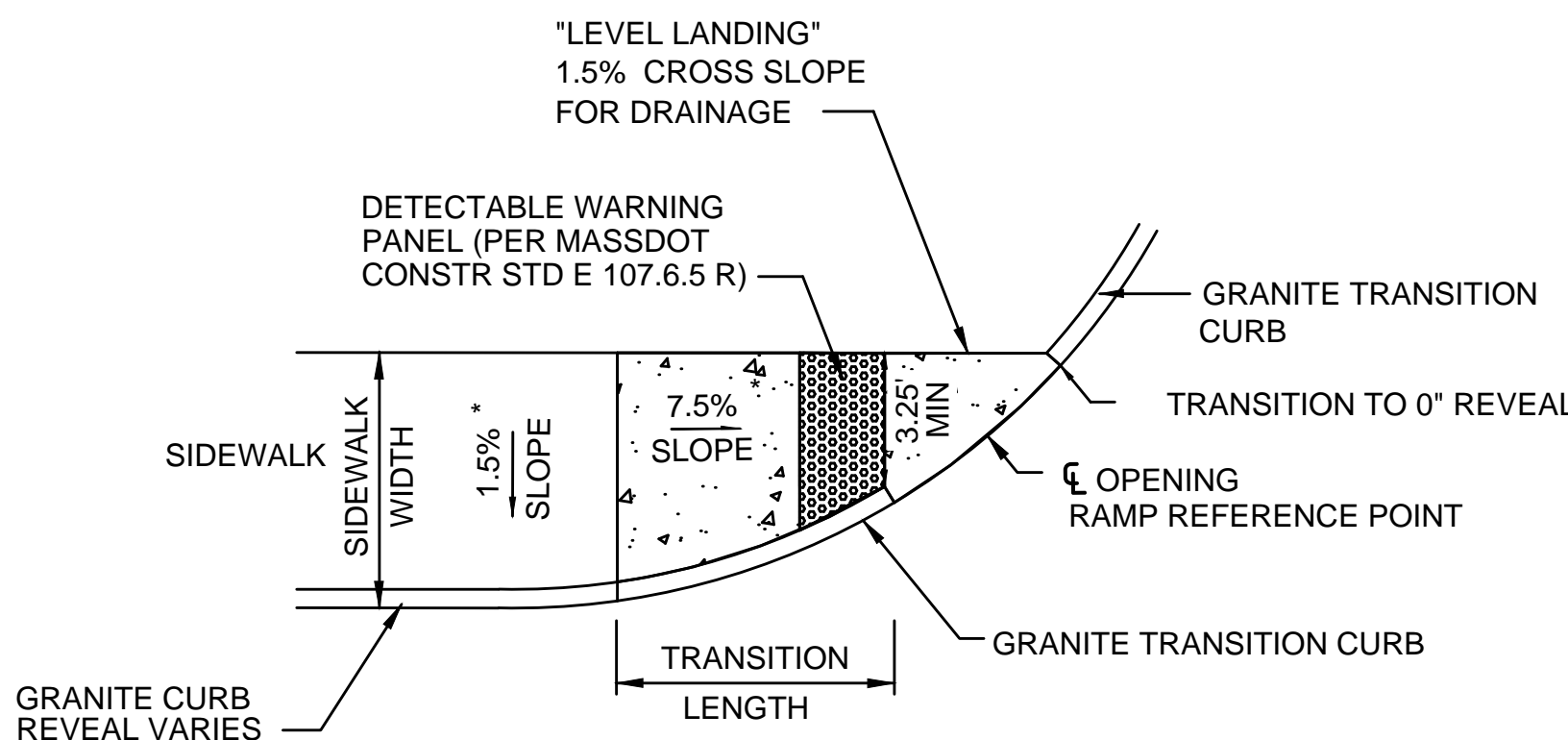
SCALE: N.T.S. DWG: DATE:



TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP - ONE WING
SIDEWALK LESS THAN 6.5 FT WITH PERPENDICULAR RAMP

SCALE: N.T.S. DWG: DATE:



* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEEL CHAIR RAMP
SINGLE DIRECTION

SCALE: N.T.S. DWG: DATE:

DETECTABLE WARNING PANELS

NTS

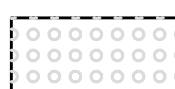
NOTES:

- DETECTABLE WARNING PANELS ARE REQUIRED TO BE CONSTRUCTED ON ALL PROPOSED WHEELCHAIR RAMPS AND ARE TO BE INSTALLED IN ACCORDANCE WITH MASSDOT CONSTRUCTION STANDARD E 107.6.5R.
- PANELS MAY BE CONCRETE PRECAST OR CAST IN PLACE OR OTHER SUITABLE MATERIAL PERMANENTLY APPLIED TO THE RAMP. THERE MUST BE A MINIMUM 70% CONTRAST IN LIGHT REFLECTANCE BETWEEN THE DETECTABLE WARNING AND AN ADJOINING SURFACE.
- NO SEPARATE PAYMENT SHALL BE MADE FOR DETECTABLE WARNING PANELS, BUT ALL COSTS IN CONNECTION THERE WITH SHALL BE INCLUDED WITH ITEM 701.2.

LEGEND



LIMITS OF CEMENT CONCRETE
WHEELCHAIR RAMP



LIMITS OF DETECTABLE WARNING
PANEL (SEE SPECIFICATIONS FOR COLOR)

